TAMIL NADU AGRICULTURAL UNIVERSITY

COIMBATORE

SIXTEENTH ANNUAL REPORT

APRIL 1, 1986 TO MARCH 31, 1987

CONTENTS

			Page
1.	Introduction	—	1
2.	University Administration	—	8
3.	Education	—	40
4.	Research	—	65
5.	Extension Education	—	93

Appendices

I. Civil Works

II. List of Schemes

III. List of Books and Booklets Published

IV. List of Research Papers Published

1. INTRODUCTION

The Sixteenth Annual Report of Tamil Nadu Agricultural University covers the period from 1.4.1986 to 31.3.1987. Significant achievements were made during the year in the fields of agricultural education, research and extension education. New post-graduate courses in the fields of energy, environment, water management, agricultural engineering and econometrics were started. Fifteen new varieties of crops were released for general cultivation. New production techniques were developed in the faculties of agriculture, horticulture, agricultural engineering, veterinary and animal sciences and fishery science. Socio-economic studies covering cost of cultivation of major crops, employment of rural labour force, techno-economic studies at district level, economics of sericulture, dairy, and mixed farming, diffusion and adoption of new technologies, demographic studies etc. were also undertaken. The research approach continued to be one of multi-disciplinary and concentration was on applied research to solve field problems. Farmers' participatory research was followed in on-farm research. The field problems were identified and discussed in the various forums of the University such as Research Council, Regional Research Councils and Scientific Workers' Conference. Pressing problems were discussed, projects on hand were reviewed and new thrust was given in the research efforts through the Crop Scientists' Meets and Social Scientists' Meet of the University. Field problems referred to the University by the development departments of agriculture, horticulture, oilseeds, fisheries and forestry and District Technical Committee were given priority in the research agenda of the University.

Important research areas such as integrated nutrient management, judicious pest and disease management, farming systems research, bio-technology, bio-energy, environment and ecology and tissue culture continued to receive adequate attention.

The research findings of the University were effectively disseminated by the strong extension education net work comprising of Communication Centres, Krishi Vigyan Kendras, National Demonstration Centres, Plant Clinic Centres and Livestock, Poultry and Sheep Research and Development Centres distributed all over the State. Field days, Farmers' days and training programmes were organised to discuss and disseminate the latest technologies. New techniques of agricultural production were also disseminated through mass media like radio, television, newspapers and farm magazines.

The major achievements of the University in the fields of education,

research and extension education are summarised below :

Education

* During the academic year 1986-87 the following new post-graduate programmes were started.

  - M.Sc. in Water Management
  - M.Sc. in Environment Science
  - M.E. (Ag) in Agro-energy and Power
  - Ph.D. in Agricultural Engineering and
  - Ph.D. in Econometrics

* Infrastructural facilities at the Agricultural College, Killikulam and Veterinary College and Research Institute, Namakkal were appreciably strengthened.

* Fifty-nine students of the University obtained ICAR Junior Fellowships in 1986 - 87 out of 230 fellowships awarded by the ICAR on the basis of the all India competitive examination and it formed nearly 26 per cent of the total number of fellowships.

* Twenty medals and prizes were instituted in the various degree programmes offered by the University for the encouragement of the students.

* A total of 822 students at undergraduate level, 226 at Master's level and 69 at Ph. D. level were admitted in the six campuses of the University. The corresponding number of students passed out was 443, 173 and 41 respectively. The total number of students admitted was 1117 and 657 passed out

Research

The following new schemes were sanctioned during 1986-87 :

ICAR Coordinated Schemes

* All India Coordinated Pearl Millet Improvement Project.

* All India Coordinated Research Project on Biological Control of Crop Pests and Weeds.

* All India Coordinated Research Project on Maize.

* All India Coordinated Research Project on Agricultural Acarology.

ICAR Adhoc Schemes

* Capital Requirement and Modernisation of Indian Agriculture.

* Increasing Income and Employment through Optimal Farm Planning and Identification of Constraints.

Government of India Schemes

* Plasticultural Application and Development in Agricultural Operation.

* Scheme on Extent of Concealed Tenancy in Tamil Nadu.

* Production of Coconut Plant through Tissue Culture Techniques.

* Establishment of Regional Centre for Fuel Efficient Stove Technology.

Other Agency Schemes

* Planning for Rural Future-An Experiment (Ford Foundation).

* Maximization of yield in Rice (Potash Research Institute of India).

* The research work undertaken by the University included 90 ICAR research (28 fully financed and 62 partly financed projects), four NARP sub-projects, 175 University schemes, 28 Government of India schemes and 17 schemes supported by other agencies. Apart from these there were about 1200 research sub-projects that were being attended to by the scientists of the University.

* The concerted efforts of the university resulted in the release of 15 varieties of crops in 1986-87 as detailed hereunder :

Rice	:	ADT 37
		ADT 38
		TPS 2
Ragi	:	TRY 1
Samai	:	Paiyur 1
Tenai	:	K 3
Panivaragu	:	CO 4
Blackgram	:	ADT 4
		Vamban 1
Groundnut	:	ALR 1
Sugarcane	:	COC 86062
Bhendi	:	CO 2
Apple	:	KK 1
Geranium	:	KK 1
Mushroom	:	CO 1

Besides the release of new varieties, the following important new technologies were developed in 1986-87.

* Usefulness of the stem nodulating green manure crop *Sasbania rostrata* was assessed for Tamil Nadu condition. It was found that it could produce 30 t/ha of green matter contributing about 150 kg N/ha.

* Restorer lines (pollinators) were identified in rice under hybrid rice programme.

* Interaction studies with BGA and other bio-fertilizers indicated that BGA plus *Azospirillum* combination was compatible and increased the rice yield by 15 3 per cent over 100 kg N/ha alone.

* Application of coir pith or pressmud or green leaves to saline soil and leaching of soil prior to planting increased the rice yield.

* Foliar spray of Kinetin 20 ppm at heading, GA 25 ppm at panicle initiation and coconut water 2% (v/v) at panicle initiation and heading increased the rice yield by 23.3%, 14.3% and 12.2% respectively.

* Spraying monocrotophos 36 WSC at 500 ml/ha proved effective for the control of rice leaf folder.

* Rice yield losses due to key pests and diseases, *viz*., stem borer, leaf folder, brown spot and sheath rot in unprotected case were 16.26 per cent for IR 50 and 10.42 per cent for CO 43.

* Leaf folder incidence in rice was found to be minimum when N was applied as USG.

* Thiophanate methyl and ediphenphos ranked best in the control of brown spot in rice.

* Intercropping of cowpea (CO 1) in sorghum registered highest net return of Rs. 4950/ha under irrigated condition.

* The bed-furrow system of irrigation with 0.6 IW/CPE ratio resulted in highest water use efficiency of 10.44 kg/mm/ha in sorghum.

* The combined application of chlorpyriphos and DDT with thiram or captan or carbendazim proved efficient in the control of shootfly and seed borne fungi in sorghum.

* In cumbu, combined application of *Azospirillum* and VA mycorrhizal fungi along with 20 kg P_2O_5/ha accounted for a grain yield of 3148 kg/ha.

* Redgram culture NPRR 2, registering a yield of 1372 kg/ha, showed resistance to sterility mosaic.

* KB 1 and NPRB 1 blackgram were found to be suitable intercrops for cotton with cost-benefit ratios of 5.35 and 4.74.

* For soybean, optimum level of NPK was found to be 20 : 30 : 20 kg/ha, at Paiyur.

* In groundnut, basal incorporation of coir dust at 5 t/ha a fortnight prior to sowing reduced the crusting problem and improved the groundnut yield.

* Combined spray of DAP (0.5%), planofix (40 ppm) and ammonium sulphate (0.2%) improved the groundnut yield by 18 per cent.

* Yield loss in groundnut due to leaf miner, *Aproaerema modicella* was 6.58 kg/ha per larva/m².

* Transplanting of 14-day old seedlings of gingelly either from painursery or from raised bed nursery proved advantageous over direct seeding.

* Spraying of dimethoate (0.03%) or monocrotophos (0.4%) or methemyl (0.02%) was effective in the control of coconut coccid.

* In cotton, basal application of NPK at 40 : 40 : 20 kg/ha followed by top dressing of 20 kg N each at 45 and 60 DAS along with foliar application of K (10 kg/ha each) resulted in additional yield of 3.05 q/ha over recommended 80 : 40 : 40 kg NPK/ha with N in two splits.

* Butachlor at 1.00 kg/ha proved to be an effective herbicide for dicot weeds of cotton.

* Studies at Coimbatore during summer on LRA 5166 revealed that spraying thrice at 10 days interval with any one of fenvalerate, cypermethrin, deltamethrin, fenpropathrin, flucythrinate, fluvalinate and monocrotophos caused resurgence of whitefly.

* Pelleting of cotton seeds with *T. harzianum* and *T viride* reduced

the post-emergence mortality to 13.0 and 18.8 per cent respectively from 75.2 per cent in the control.

* Fodder maize (African tall) and cowpea in 2 : 1 ratio registered 244 t/ha of green fodder, 6.47 t/ha of drymatter and 617 kg/ha of crude protein.

* In maize, manurial schedule of 135: 67.5 : 35.0 kg NPK/ha over basal FYM at 10 t/ha resulted in high seed recovery, cob weight and hundred seed weight.

* In seed cumbu, 80 : 40 : 40 kg NPK/ha recorded high seed weight, rate of germination and seedling vigour.

* Cotton seeds could be upgraded by imbibition, drying and separation technique.

In bhendi, application of carbofuran or phorate at 1.00 kg a.i./ha plus urea 45.6 kg/ha and neem cake 200 kg/ha recorded reduction in population of *Helicotylenchus* and *Hoplolaimus*.

In tomato, pre-emergence application of pendimethalin at 1.0 kg/ha or fluchloralin at 1.0 kg/ha or oxadiazon at 0.50 kg/ha gave effective control of dicot weed, *Trianthema portulacastrum*.

Pruning *J. sambac* at 50 cm from ground level gave a significant yield of 365.65 g/plant.

In chrysanthemum, NPK at 20 g/m² gave consistently good yield of 16.77 t/ha.

* In turmeric, application of ferrous sulphate at 30 kg/ha increased the rhizome yield by 24.17 per cent.

* Optimum water requirement for the major crops in Coimbatore under sprinkler irrigation system was arrived at.

* Provision of drainage through underground pipelines 60 cm below the surface increased the yield of IR 50 rice in Coimbatore

* Water stress during pod development stage resulted in the maximum reduction (30 per cent) in groundnut yield

* Irrigating K2 chillies at 1.0 IW/CPE ratio increased the pod yield to 21.7 q/ha

* Summer ploughing in Thanjavur was found to decrease the water requirement for field preparation by 65 mm to 150 mm.

* The following new devices were developed at the college of Agricultural Engineering :

  - Insect suction trap
  - Tractor operated hoist
  - Low cost Dheenabandhu biogas plant
  - Furnace for copra drying
  - Buffing cum roasting machine
  - Seed Planter
  - Improved *gorru*

* Suitable tissue culture media were identified for conducting Karyological studies in bovines.

2. UNIVERSITY ADMINISTRATION

OFFICERS OF THE UNIVERSITY

Chancellor	:	His Excellency Thiru S. L. Khurana The Governor of Tamil Nadu
Pro-Chancellor	:	Dr. K. Kalimuthu Hon'ble Minister for Agriculture (upto 20.10.1986) Thiru K. Rajaram Hon'ble Minister for Industries and Agriculture (from 21.10.86)
Vice-Chancellor	:	Dr. V. Rajagopalan
Registrar	:	Dr. N. Shanmugam
Comptroller	:	Thiru G. Prabhakaran Nair
Dean, AC & RI, Coimbatore	:	Dr. K. R. Ramaswamy
Dean, College of Agricultural Engineering, Coimbatore	:	Dr. V Subramaniyan
Dean, Faculty of Horticulture, Coimbatore	:	*Dr. K. G. Shanmugavelu*
Dean, Post-graduate Studies, Coimbatore	:	Dr. V. D. Guruswamy Raja
Dean, AC & RI, Madurai	:	Dr. T. Kumaraswami
Dean, Madras Veterinary College, Madras	:	Dr. P. Kothandaraman
Dean, Fisheries College, Tuticorin	:	Dr. G. Jegatheesan (Additional charge)
Dean, Agricultural College, Killikulam	:	Dr. T. K. Kandaswamy

Dean, Veterinary College and Research Institute, Namakkal	:	Dr. R. Ramamurthi
Director of Research (Agri), Coimbatore	:	Dr. M. Balasubramanian
Director of Extension Education, Coimbarore	:	Dr. S. R. Sree Rangaswamy (Additional charge upto 15.4.86) Dr. S. Sankaran (from 16.4.86)
Director, School of Genetics, Coimbatore	:	Dr. S. R. Sree Rangaswamy
Director, Centre for Agricultural and Rural Development Studies, Coimbatore	:	Dr. A. Kandaswamy
Director, Centre for Plant Protection Studies, Coimbatore	:	Dr. S. Jayaraj
Director, Centre for Soil and Crop Management Studies, Coimbatore	:	Dr. S. Subramanian
Director, Water Technology Centre, Coimbatore	:	Dr. V. Subramaniyan (Additional charge upto 21.12.86) Dr. P. Kandaswamy (from 22.12.86)
Director, Tamil Nadu Rice Research Institute, Aduthurai	:	Dr. S. Chelliah
Director of Research (Animal Science), Madras	:	Dr. S. Venkatayan (upto 30.4.86) Dr. C. V. Gopalakrishnan (from 1.5.86 to 31.7.86) Dr. P. Kothandaraman (Additional charge from 1.8.86)
Director, Institute of Animal Nutrition, Kattupakkam	:	Dr. C. V. Gopalakrishnan (Additional charge upto 31.7.86) Dr. P. Kothandaraman (Additional charge from 1.8.86)
Director, Animal Health, Trichy	:	Dr. T. M. Thangaraj
Estate Officer, Coimbatore	:	Thiru A. Rathinasabapathy

9. Approved the payment of stipend of Rs. 250/- p. m. per student for all the under-graduate students attending the Village Stay Programme.

10. Approved the implementation of the new scheme 'Research project for maximisation of yield in rice' financed by M/S Potash Research Institute of India, New Delhi.

11. Approved the formation of University Sports Council in the University.

12. Approved the conferment of the Honorary Degree (D. Sc.) to Mr. W.O. Omama, Hon'ble Minister for Agriculture, Government of Kenya, at the 12th Convocation of the Tamil Nadu Agricultural University.

13. Approved the revision of convocation fees for various degree programmes of the Tamil Nadu Agricultural University.

14. Approved the implementation of 19 new schemes in the University with the State plan funds during 1986-87.

15. Approved the implementation of the new ICAR scheme - All India coordinated pearl millet improvement project, Coimbatore.

16. Approved the implementation of the scheme 'Production of coconut plants through tissue culture techniques'.

17. Approved the creation of posts for Agrl. College, Killikulam under the IV Phase from 1987-88.

Administration

1. Accepted to recruit Assistant Professors with Master's degree in the concerned faculty.

2. For acquiring the Ph.D. qualification, further extension of time beyond the period 9.1.1987 was approved.

3. Approved the creation of posts of Junior Assistant Professors against the vacancy of Assistant Professors with Government scale of pay.

4. Scheme of Emeritus Scientists' appointment was implemented with the scientists who were able and willing to work in projects of the University's choice and decision.

5. Approved the norms and procedures for implementing the merit promotion scheme in the University on the basis of ICAR model.

6. A sub-committee was constituted to examine the various developments at Fisheries College, Tuticorin.

7. Approved the creation of a new post of Assistant Law Officer.

8. Approved the adoption of six hours of working per day for Artisans attached to the engineering workshops in the University.

9. Approved the land allotted to the department of Agriculture at the Agricultural Research Station, Tindivanam for Tamil Nadu Women in Agricultural Project.

10. Approved the sanction of vehicles loan to the University employees.

Budget

1. Approved the audit report of Tamil Nadu Agricultural University for 1984-85.

2. Approved the scheme proposal of erection of gobar gas plant through government grant in the Tamil Nadu Agricultural University for Rs. 3.00 lakhs.

Civil works

1. Sanctioned Rs. 5.50 lakhs for the formation of a reservoir for Fisheries College, Tuticorin.

2. Sanctioned Rs. 25.18 lakhs for the construction of four blocks of hostels at Agricultural College, Killikulam.

3 Sanctioned Rs. 12.00 lakhs for the construction of Auditorium at Fisheries College, Tuticorin.

4. Sanctioned Rs. 4.00 lakhs for the construction of an indoor games block at Fisheries College, Tuticorin.

Miscellaneous

The donation of sprinkler by M/S A. V. Thomas and Company Limited, Madras to the Agricultural College and Research Institute, Madurai was approved.

ACADEMIC COUNCIL

Chairman

Vice-Chancellor	:	Dr. V. Rajagopalan

Members

Commissioner and Secretary to Government, Agriculture Department	:	Thiru A. Venkataraman, I.A.S.,

Deans

Agrl. College & Research Institute, Coimbatore	:	Dr. K. R. Ramaswamy
Agrl. College & Research Institute, Madurai	:	Dr. T. Kumaraswami
Agricultural College, Killikulam	:	Dr. T. K. Kandaswamy
College of Agricultural Engineering, Coimbatore	:	Dr. V. Subramaniyan
Madras Veterinary College, Madras	:	Dr. P. Kothandaraman

Veterinary College and Research Institute, Namakkal	:	Dr. R. Ramamurthi
Fisheries College, Tuticorin	:	Dr. G. Jegatheesan (Additional charge)
Post-graduate Studies, Coimbatore	:	Dr. V. D. Guruswamy Raja
Faculty of Horticulture, Coimbatore	:	Dr. K. G. Shanmugavelu

Directors

Director of Research (Agriculture), Coimbatore	:	Dr. M. Balasubramanian
Director of Research (Animal Science), Madras	:	Dr. S. Venkatayan (upto 30.4.86) Dr. C. V. Gopalakrishnan (from 1.5.86 to 31.7.86) Dr. P. Kothandaraman (Additional charge from 1.8.86)
Director of Extension Education, Coimbatore	:	Dr. S. R. Sree Rangaswamy (upto 15.4.86) Dr. S. Sankaran (from 16.4.86)
Director, CARDS, Coimbatore	:	Dr. A. Kandaswamy
Director, School of Genetics, Coimbatore	:	Dr. S. R. Sree Rangaswamy
Director, Water Technology Centre, Coimbatore	:	Dr. V. Subramaniyan (upto 21.12.86) Dr. P. Kandaswamy (from 22.12.86)
Director, Centre for Plant Protection Studies, Coimbatore	:	Dr. S. Jayaraj
Director, Centre for Soil and Crop Management Studies, Coimbatore	:	Dr. S. Subramanian
Director, Animal Health, Trichy	:	Dr. T. M. Thangaraj

Director, Institute of Animal Nutrition, Madras : Dr. C. V. Gopalakrishnan (Additional charge upto 31.7.86)

Dr. P. Kothandaraman (Additional charge from 1.8.86)

Director, Tamil Nadu Rice Research Institute, Aduthurai : Dr. S. Chelliah

Six members among the Heads of Departments nominated by the Vice-Chancell

Dr. D. Chandrasekaran,
Professor and Head,
Department of Soil and Water Conservation Engineering,
Coimbatore (upto 21.11.86)

Prof. N. R. Chandrasekaran
Professor and Head,
Department of Forage Crops,
Coimbatore (from 6.2.86 to 21.11.86)

Dr. R. Ramamurthi,
Professor and Head,
Department of Meat Hygiene and Technology,
Madras Veterinary College,
Madras (upto 15.4.86)

Dr. P. Mahalingam,
Professor and Head,
Animal Disease Investigation and Control,
Madras Veterinary College,
Madras (from 12.5.86 to 21.11.86)

Dr. V. Ulaganathan,
Professor and Head,
Department of Animal Genetics,
Madras Veterinary College,
Madras (upto 21.11.86)

Dr. K. G. Shanmugavelu,
Professor and Head,
Department of Horticulture,
Agricultural College and Research Institute,
Madurai (upto 15.4.1986)

Dr. J. B. M. Abdul Khader,
Professor and Head,
Department of Floriculture and Spices,
Faculty of Horticulture,
Coimbatore (from 12.5.86 to 21.11.86)

Prof. K. R. Swaminathan,
Professor and Head,
Department of Bio-energy,
College of Agricultural Engineerin
Coimbatore (from 22.11.86)

Dr. V. Meenakshisundaram,
Professor and Head,
Department of Agricultural Econo
Coimbatore (from 22.11.86)

Dr. N. Raghavan,
Professor and Head,
Department of Preventive Medici
Madras Veterinary College,
Madras (from 22.11.86)

Dr. K. Venkataramanujam,
Professor and Head,
Department of Fish Culture,
Fisheries College,
Tuticorin

Dr. I. Irulappan,
Professor and Head,
Department of Horticulture,
Agricultural College and
Research Institute,
Madurai

Dr. V. Gnanaprakasam,
Professor and Head,
Department of Therapeutic
Madras Veterinary College,
Madras (from 22.11.86)

Three members having special knowledge or practical experience in different aspects of agriculture nominated by the Vice-Chancellor

Upto 22.11.86	From 23.11.86
Prof. AR. Lakshmanan, Dean, College of Agriculture, Annamalai University, Annamalainagar	Dr. S. Subbayya, Dean (Agri.) Andhra Pradesh Agricultural University, Rajendranagar, Hyderabad
Dr. R. Ramiah, Professor and Head, Department of Agricultural Engineering, University of Agricultural Science, Dharwad.	Dr. R. C. Maheswari, Project Co-ordinator, RES Scheme, Central Institute of Agricultural Engineering, Shri Guru Tegh Bahadur Complex, T. T. Nagar, Bhopal.
Prof. A. Gnanam, Vice-Chancellor, Bharathidasan University, Tiruchirapalli	Dr. B. U. Rao, Joint Director, Indian Veterinary Research Institute, H. A. Farm, Hobbat, Bangalore.

Secretary

Registrar	Dr. N. Shanmugam

Meetings of the Academic Council

The Academic Council met thrice during the year under report. The following important decisions were taken.

1. Accepted the proposal on the creation of posts of Associate Professors at Uthagamandalam under the faculty of Horticulture.
2. Accepted the proposal on the formation of University Sports Council in the University.
3. Accepted the proposal on the re-designation of certain departments at the Madras Veterinary College, Madras.
4. Accepted the proposal on the collection of fees for the affiliation of Colleges to the Tamil Nadu Agricultural University.
5. Accepted the admission of Agricultural Engineering graduates to the M.Sc(Ag) in Agricultural Economics.
6. Accepted the proposal of the recognition of the Central Plantation Crops Research Institute, Kasargod as a post-graduate research centre.

7. Accepted to recommend the conferment of Honorary degrees on dignatories to the Board of Management for its approval.

8. Accepted the creation of one post of Associate Professor (Seed Technology) at Coimbatore campus.

9. Accepted the revision of convocation fees for various degree programmes of the Tamil Nadu Agricultural University.

10. Accepted the academic robes for conferment of D. Sc. *(Honoris causa)* degree at the Convocation.

11. Accepted the academic robes for the post-graduate programme leading to M.F.Sc. at the Convocation.

12. Accepted the proposal for the institution and implementation of a Chair offered by M/S Rallis (India), Limited, Bombay in the Tamil Nadu Agricultural University.

13. Accepted the proposal to increase the admission strength of post-graduate degree programmes of Tamil Nadu Agricultural University for the Academic year 1986-87.

14. Accepted the proposal to incorporate certain norms in the prospectus of undergraduate degree programme from the year 1987-88 for reservation of seats for sons of farmers/fishermen in the University.

15. Accepted the instruction on the revised Ex-servicemen certificate in the undergraduate prospectus and application form from the academic year 1987-88 to avoid false claims.

16. Accepted the proposal on the continuation of ICAR Scheme on (UNDP) Centre of Advanced Studies in Agricultural Microbiology at the Department of Agricultural Microbiology, Coimbatore.

17. Accepted the new format of leaving certificate to the constituent colleges of Tamil Nadu Agricultural University.

18. Accepted the appointment of the Chairman and Members of the Recognition Committee.

19. Accepted the proposal for the creation of posts for the IV phase at Agricultural College, Killikulam

20. Accepted the proposal on the increase in the number of internal deputation candidates in the faculty of Veterinary and Animal Science.

21. Accepted the proposal in principle for starting a degree course in Dairy Science Technology.

BOARD OF STUDIES

The Board of Studies in Agriculture, Agricultural Engineering, Veterinary and Animal Science, Horticulture and Fishery Science constituted during March, 1986 continued during the period under report. Each Board of Studies consisted of the following members.

1. Dean of the Faculty (Chairman)
2. Other Deans within the Faculty

3 Heads of Departments of the concerned Faculty

4. All the Professors of the Faculty

5. Two elected representatives from among Associate Professors and four from among Asst. Professors.

6. Two experts in the concerned subjects from outside the University nominated by Vice-Chancellor.

I. Faculty of Agriculture

Elected Members

1. Dr. C. Ramaswamy,
Associate Professor,
Department of Agrl. Economics,
Tamil Nadu Agrl. University,
Coimbatore

2. Thiru N. Sivaswamy,
Associate Professor (Agrl. Botany),
Agricultural College,
Coimbatore

3 Thiru M. N. Bhudhar,
Assistant Professor (Agronomy)
Regional Research Station,
Paiyur.

4. Thiru K. Ponnuswamy,
Asst. Professor (Agronomy),
National Pulses Research Centre,
Vamban, Pudukkottai

5. Thiru R. Murugesan,
Assistant Professor (Agrl. Microbiology),
National Pulses Research Centre,
Vamban, Pudukkottai

6. Thiru S. Ramaswamy,
Assistant Professor (Agronomy),
Tamil Nadu Rice Research Institute,
Aduthurai

Nominated Members

1. Dr. R. Ramanna,
Professor and Head,
Director of Instruction (Agri.) (i/c)
Department of Agrl. Economics,
University of Agrl. Science,
GKVK Campus,
Bangalore-560 060.

2. Dr. S. Chandrasekaran,
Professor and Head,
Department of Soil Science,
Annamalai University,
Annamalai Nagar,

Meetings

The Board of Studies met twice during the year under report and recommended the following to the Academic Council:

1. Courses for the IV year B.Sc (Ag).
2. Revision of the total credit load for the B.Sc (Ag).
3. Number of days on study tours under B.Sc (Forestry) programme.
4. Procedure for the improvement of OGPA by under-graduate students.

Meetings

The Board of Studies met once during the year under report and recommended the following to the Academic Council.

1. Revised syllabus for M.E. (Ag) Water Management degree programme.
2. Draft syllabus for Ph.D. programme in Agricultural Engineering.
3. Implementation of Village Stay programme for B.E (Ag) students admitted from 1984-85 onwards.
4. Proposal on the development of new course in bio-technology at P.G. level.
5. Assessment and evaluation of research credits upto the submission of thesis.
6. Distribution of course and research credits for P G programmes - M.E(Ag) and Ph.D.

Faculty of Veterinary & Animal Sciences

Elected Members

Dr. S. Jayasunder,
Associate Professor,
Dept. of Pharmacology,
Madras Veterinary College,
Madras.

Dr. V. Kathaperumal,
Associate Professor,
Dept. of Animal Nutrition,
Madras Veterinary College,
Madras (upto 19.8.86)

Dr. R. Nadanam,
Associate Professor,
Dept. of Animal Nutrition,
Madras Veterinary College,
Madras (from 27.2.87)

Dr. Venkataraman,
Assistant Professor,
Dept. of Therapeutics,
Madras Veterinary College,
Madras (upto 24.8.86)

Dr. V. Thiagarajan,
Assistant Professor,
Dept. of Animal Genetics,
Madras Veterinary College,
Madras (from 12.7.86 to 19.8.86)

Dr. B. Neduncheralathan,
Assistant Professor,
Madras Veterinary College,
Madras (from 20.1.86 to 20.4.86)

Dr. D. Kathiresan,
Assistant Professor,
Dept. of Obstetrics & Gynaecology,
Madras Veterinary College,
Madras (from 12.7.86)

Dr. K. Duraiswamy,
Assistant Professor,
Livestock Research Station,
Kattupakkam.

Dr. P. Dhanabalan,
Assistant Professor,
Dept. of Clinics,
Madras Veterinary College,
Madras (upto 18.8.86)

Dr. S. N. Sivaselvam,
Dept. of Animal Husbandry Economics,
Madras Veterinary College,
Madras (from 27.2.87)

Dr. N. Daniel Joy Chandran,
Assistant Professor,
Livestock Research Station,
Kattupakkam (from 27.2.87)

Nominated Members

Dr. C. V. Reddy,
Dean, Faculty of Veterinary Medicines,
Andhra Pradesh Agrl. University,
Rajendranagar, Hyderabad.

Dr. A. Ramakrishnan,
Director,
Centre of Advance Studies (Poultry),
Kerala Agrl. University,
Mannuthy, Trichur.

Meetings

The Board of Studies met twice during the year under report and recommended the following to the Academic Council :

1. Considering the registration for the supplementary examination as an attempt.
2. Proposal to conduct the South India and All India study tours together after the completion of the final year.
3. Relaxation for the arrear students to offer the same course as per the syllabus of that particular batch admitted in any one year instead of the equivalent course in the restructured syllabus.
4. Proposal on flexibility in the offering of core courses in a particular trimester.
5. Distribution of course and research credits for P. G. programmes.
6. Admission of even a single candidate for P. G. programme by offering the courses in common by the departments of allied nature.
7. Review of performance of I B.V.Sc., 1985-86 batch at the end of II Trimester and stipulation of minimum OGPA at the end of II year for eligibility to go to III year besides other requirements.
8. Proposal to increase the number of Internal Deputees.
9. Board decisions taken at the Postgraduate workshop held at Coimbatore.
10. Permission of staff members doing PG programme on full-time basis to rejoin duty after completion of the course credits and continue their studies by registering the research credits on part-time basis.

Faculty of Horticulture

Elected Members

1. Dr. R. Subbiah,
Associate Professor,
Dept. of Horticulture,
Agrl. College and Res. Instt.,
Madurai.
2. Thiru S. Thamburaj,
Associate Professor,
Faculty of Horticulture,
Tamil Nadu Agrl. University,
Coimbatore.
3. Thiru S. Natarajan,
Assistant Professor,
Department of Horticulture,
Agrl. College and Res. Instt.,
Madurai.
4. Thiru D. Veeraraghava Thatham,
Assistant Professor (Hort),
Regional Research Station,
Vridhachalam.

5. Thiru E. Vadivel,
Assistant Professor,
Faculty of Horticulture,
Tamil Nadu Agrl. University,
Coimbatore.

6. Thiru S. Annadurai,
Assistant Professor,
Faculty of Horticulture,
Tamil Nadu Agrl. University,
Coimbatore.

Nominated Members

1. Dr. S. N. Rao,
Chairman,
Andhra Pradesh Forest Devt.
Corporation Ltd.,
N.M.D.C. Buildings,
6th Floor, MASAB Tank,
Hyderabad.

2. Dr. P. G. Sivaraman Nair, Ph.D.,
Director of Research,
Kerala Agricultural University,
Vellanaikkara, Trichur,
Kerala State.

Meetings

The Board of Studies met once during the year under report and recommended the following to the Academic Council.

1. Proposal of revised courses for M Sc (Hort) and Ph.D. degree programmes.

2. Revision of course number for the Horticulture courses offered to B.Sc (Ag).

Faculty of Fisheries

Elected Members

1. Thiru P. Selvaraj,
Associate Professor,
Fisheries College,
Tuticorin.

2. Dr. V. Sundararaj,
Associate Professor,
Polyculture Scheme,
Vedaranyam.

3. Thiru T. K. Sundaram,
Assistant Professor,
Fisheries College,
Tuticorin.

4. Dr. SP. Palaniappan,
Assistant Professor,
Fisheries College,
Tuticorin.

5. Dr. N. Sukumaran,
Assistant Professor,
Fisheries College,
Tuticorin.

6. Dr. V. Ramadass,
Assistant Professor,
Fisheries College,
Tuticorin.

Nominated Members

1. Dr. C T. Samuel,
Prof. and Head,
Dept. of Industrial Fisheries,
Foreshore Road,
University of Cochin,
Cochin - 686 016.

2. Prof. R. K. Salian,
Head of Division (Fisheries Science)
College of Fisheries,
University of Agrl. Sciences,
Bangalore - 577 002.

Meetings

The Board of Studies met once during 1986-87 and recommended certain revision and addition in M.F.Sc. syllabus, plan of work for the Village Stay Programme of the students of the Fisheries College, Tuticorin and introduction of a short tour for the II B.F.Sc. students and consequent revision of study tours incorporating three tours.

RECOGNITION COMMITTEE

The Recognition Committee met twice during the period under report and recommended the following to the Academic Council :

Recognition of M. Sc (Mariculture) offered at the Central Marine Fisheries Research Institute, Cochin as equivalent to M.F.Sc.. in Fish Culture of Tamil Nadu Agricultural University for the purpose of appointment in Tamil Nadu Agricultural University provided the candidates possess the basic degree of B.F.Sc.

Recognition of B.Sc (Plant Science) of Kabul University for the purpose of admission to the M.Sc degree in Agricultural Economics in Tamil Nadu Agricultural University.

Recognition of DIPLOMAGRARINGENIEUR (corresponding to M.Sc (Ag)) of the Karl Marx University, Leipzig as equivalent to M.Sc (Ag) of Tamil Nadu Agricultural University.

Recognition of P.U. (Agri) of North-Eastern Hill University. Shillong and Intermediate Examination of Bihar, Intermediate Education Council Patna through the L. N. Mithila University, Dharbunga as equivalent to the H.Sc Examination of Tamil Nadu.

Recognition of the following degrees awarded by the University noted against each as equivalent to the under-graduate degree of the Tamil Nadu Agricultural University for the purpose of admission to the post-graduate degree courses of Tamil Nadu Agricultural University.

Name of the Degree	Name of the University
B.V.Sc.,	University of Agricultural Sciences, Bangalore
B.V.Sc.,	Orissa University of Agriculture & Technology, Bhubaneswar
B.V.Sc., & A.H.	Bidhan Chandra Krishi Viswa Vidhyalaya, West Bengal
B. Sc (Ag)	University of Liberia
B.Sc (Plant Science)	Kabul University

Recognition of Diploma in Tropical Agriculture of the Fiji College of Agriculture as equivalent to H.Sc. of Tamil Nadu for the purpose of admission to under-graduate degree programmes of the Tamil Nadu Agricultural University.

BOARD OF EXAMINATION

Board of Examination met thrice during the year under report. The following decisions were taken :

1. Ratified the dates fixed for the commencement of the III (1984 - 85 batch) and I (1985-86 batch) semester examinations of the Diploma in Agriculture of Sri Ramakrishna Mission Vidyalaya.

2. Reviewed, moderated and provisionally declared the results of III (1984 85 batch) and I (1985-86 batch) semester examinations of the Diploma in Agriculture.

3. Ratified the action taken on the appointment of question paper setters/ External Examiners for the III (1984-85 batch) and I (1985-86 batch) semester examinations of the Diploma in Agriculture.

4. Ratified the dates fixed for the receipt of applications and commencement of November, 1985 B.V.Sc. supplementary examination (traditional system).

5. Ratified the changes made in the appointment of External / Internal Examiners for November, 1985 B.V.Sc., supplementary examination (traditional system).

6. Reviewed and provisionally declared the results of November, 1985, B.V.Sc., supplementary examination.

7. Ratified the dates fixed for the commencement of the IV (1984 - 85 batch) and II (1985-86 batch) semester examininations.

8. Ratified the action taken on the appointment of question paper setters/ Examiners for the IV (1984-85 batch) and II (1985-86 batch) semester examinations.

9. Reviewed and provisionally declared the results of the IV (1984-85 batch) and II (1985-86 batch) semester examinations of Diploma in Agriculture.

10. Ratified the dates fixed for the commencement of III (1985-86 batch) and I (1986-87 batch) semester examinations.

11. Ratified the action taken on the appointment of question paper setters/External Examiners for the III (1985-86 batch) and I (1986-87 batch) semester examinations.

12. Reviewed, moderated and provisionally declared the results of the III (1985-86 batch) and I (1986-87 batch) semester examinations of Diploma in Agriculture.

COURSES AND CURRICULA

The trimester system of education was followed for the under-graduate and post-graduate degree programmes of all disciplines in the constituent colleges of the University.

A total of 8040 application forms for the degree courses in Agriculture, Horticulture, Veterinary Sciences, Agricultural Engineering and Fisheries Science and 45 applications for B. Sc. (Home Science)were received.

With regard to post-graduate degree programmes 658 applications for Master's degree programmes, 328 applications for doctoral degree and 72

applications for post-graduate diploma (Sericulture) were received. Selection was made after interviewing the candidates by the different selection committees appointed by the Vice-Chancellor.

During the year under report details of enrollment and outturn in the different degree programmes are furnished below :

Degree programme	No. of students admitted	No. of students passed out
Under-graduate		
B.Sc (Ag)	356	199
B.Sc (Hort)	39	45
B.V.Sc.,	272	106
B.E. (Ag)	103	60
B.Sc (Home Science)	12	13
B.F.Sc.,	20	20
B.Sc (Forestry)	20	—
Total	822	443
Post graduate		
M.Sc (Ag)	178	149
M.Sc (Hort)	16	12
M.E (Ag)	–	2
M.Sc (Food Science)	3	3
M.V.Sc.	29	2
M.F.Sc	–	5
Total	226	173
Ph.D (Agriculture)	45	25
Ph.D (Horticulture)	3	4
Ph.D (Agrl. Engg.)	3	–
Ph.D (Vet. Science)	18	12
Total	69	41
Grand Total	1117	657

CONVOCATION OF THE UNIVERSITY

The twelfth Convocation of the University was held at the Tamil Nadu Agricultural University, Coimbatore on 28.1.1987. His Excellency, Thiru. S. L. Khurana, Chancellor of the University and Governor of Tamil Nadu, presided over the Convocation. Dr. V. Rajagopalan, Vice-Chancellor welcoming the gathering gave a brief account of the activities of the University. Honourable Thiru William Odango Omamo, Minister for Agriculture and Livestock Development, Government of Kenya, Nairobi delivered the Convocation address. The degree of Doctor of Science (*Honoris causa*) was conferred on Honourable Thiru William Odango Omamo. Honourable Thiru K. Rajaram, Pro-Chancellor of the University and Minister for Industries and Agriculture, Tamil Nadu released the Commemoration volume of the Platinum Jubilee of Agricultural College and Research Institute, Coimbatore.

At this Convocation 498 candidates received their degrees in person and 461 in absentia. Medals and prizes were awarded to 83 students for their outstanding academic performance.

TRAININGS / MEETINGS / IMPORTANT EVENTS

A seven-day training programme on 'Apiculture and Mass production of Bio-control Agents' was inaugurated on April 1, 1986 at CARDS, Coimbatore.

Dr. V. Rajagopalan, Vice-Chancellor released the newly developed fine-wool strain of sheep 'Sandyno' on April 27, 1986 at Sheep Breeding Research Station, Sandynallah.

The annual Farmers' Day and the Farmers' Contact Programme were con-

ducted on April 22, 1986 at Livestock Research Station, Kattupakkam.

The Krishi Vigyan Kendra, Madurai organised a training programme on 'Mushroom Cultivation' on May 9, 1986 at Agricultural College, Madurai.

A training on 'Production Technology of Oyster Mushroom' was conducted on May 5, 1986 at the Centre for Plant Protection Studies, Coimbatore.

Dr. V. Rajagopalan, Vice-Chancellor released a new edible oyster mushroom *Pleurotus citrinopileatus* on June 14, 1986 at Coimbatore.

The Krishi Vigyan Kendra, Madurai organised a one-day animal health camp on June 18, 1986 at Kodikulam village.

A one day contact programme for the course on integrated weed management was jointly organised by the Directorate of Extension Education and All India Radio on June 26, 1986 at Coimbatore.

A one-day Entrepreneurial Development Programme was held on June 26, 1986 at the College of Agricultural Engineering, Coimbatore.

A two-week training programme on 'Economics of Farm Irrigation Management' was organised by the Water Technology Centre on June 24, 1986 at Coimbatore.

A one-day training programme on 'Pest Surveillance and Integrated Pest Management Practices on Oilseeds' was organised by Krishi Vigyan Kendra, Madurai on July 4, 1986.

An animal health care campaign was organised on June 25, 1986 at Pudupatti village by Krishi Vigyan Kendra, Kattupakkam.

The meeting of the Regional Research Council of the North-Eastern Zone was held on June 12, 1986 at Regional Research Station, Vridhachalam.

Eighty-three in-service trainees from 26 countries visited TNAU, Coimbatore on July 26, 1986 and August 2, 1986 as a part of their educational tour programme.

A one-day training on 'Poultry Production' was conducted on July 27, 1986 by the krishi Vigyan Kendra, Madras at Karuttapuliampatti village.

A one-day training on the 'Production Technology of Oyster Mushroom was conducted on August 5, 1986 at Coimbatore.

The fifty-first annual convention of the Indian Society of Soil Science was held on September 23, 1986 at TNAU, Coimbatore.

The national symposium on 'Resurgence of Sucking Pests' was conducted on July 8, 1986 at TNAU, Coimbatore.

A summur institute on 'Manipulation of Fertility System in Plants for Crop Improvement' was held from July 21 to August 14, 1986 at TNAU, Coimbatore.

A seminar on 'Sugarcane Cultivation in East Thanjavur' was organised by TRRI, Aduthurai in collaboration with Mayiladuthurai co-operative sugar factory and All india Radio, Trichy at Mayiladuthurai on July 29, 1986.

A seminar on 'Livestock and Poultry' was organised by the Directorate of Animal Health, Trichy on August 31, 1986 at Farmers' Training Centre, Hosur.

The post-graduate workshop on 'Education and Research' was conducted on September 5-6, 1986 at TNAU, Coimbatore.

A national symposium on 'The Improvement of Teaching of English in Higher Technical Institutions' was held on September 8-17, 1986 at TNAU, Coimbatore.

The 16th Annual workshop on 'Micro-nutrients of Soils and Plants' was held on September 26-27, 1986 at TNAU, Coimbatore.

A two-week training on 'Communication Technology for Agricultural Development' jointly sponsored by Tamil Nadu Agricultural University and Union Ministry of Agriculture and Irrigation, was inaugurated on August 20, 1986.

A training on 'Extension Methods' was conducted for 10 days for the Assistant Conservators of Forests from September 16, 1986 at TNAU Coimbatore.

A five-day training programme on 'Production Technologies for Forage Crops' was conducted for 624 Livestock Inspectors in batches of 30 from July, 1986 to March, 1987 at TNAU, Coimbatore.

The state level training programme on 'Rice Production Technology for *Kharif*, 1986 was conducted on September 9-10, 1986 at TNAU, Coimbatore.

At Paddy Breeding Station, TNAU, Coimbatore, new glass house costing Rs. 3.00 lakhs for research on rice diseases was declared open by Dr. V. Rajagopalan, Vice Chancellor on October 20, 1986.

The Centre for Plant Protection Studies, Tamil Nadu Agricultural University, Coimbatore organized a 'Rice Crop Protection Day' on October 20, 1986 in collaboration with School of Genetics, TNAU, Coimbatore.

The training unit of the Directorate of Extension Education conducted four workshop-cum-trainings on Pest Surveillance, Water Management, Seed Technology and Agronomy of Millets from October 6 to 24, 1986.

The Centre for Plant Protection Studies organised a training programme on *'Integrated Pest, Disease and Nematode Management in Cotton'* from October 20 to 22, 1986.

A seminar on 'Water Management and Agricultural Inputs' was held on November 10, 1986 at TNAU, Coimbatore.

A workshop on 'Planning Agricultural Extension Training' was held at TNAU, Coimbatore on November 12, 1986.

The 'National Integration Day' was observed on November 19, 1986 at TNAU, Coimbatore.

An endowment for the institution of Rallis Chair for Professor of Agricultural Entomology was inaugurated by Dr. V. Rajagopalan, Vice-Chancellor on November 24, 1986 at TNAU, Coimbatore.

The fourth annual workshop of the All India Coordinated Research Project on 'Seed Borne Diseases' was held on November 25, 1986 at TNAU, Coimbatore.

A training programme on Dry 'Farming' was conducted for the Agricultural Officers of the State Department of Agriculture from 3rd to 7th November 1986 at TNAU, Coimbatore.

The fourteenth Environmental Education Awareness Campaign was conducted by TNAU, Coimbatore at Kotagiri on November 26, 1986.

A meeting of the Social Scientists of Tamil Nadu Agricultural University was held on December 8 and 9, 1986 at TNAU, Coimbatore.

The Centre for Plant Protection Studies, TNAU, Coimbatore conducted the 'Crop Protection Day' for millets, oilseeds, pulses, cotton and horticultural crops on December 17, 1986.

A one-month training programme on 'Soil Survey and Land Use Planning for Watershed Management' was organised from December 22, 1986 at TNAU, Coimbatore

Dr. V. Rajagopalan, Vice-Chancellor was conferred the rank of Honorary Colonel NCC on the NCC day, celebrated on January 10, 1987 at PRS Grounds, Coimbatore.

The 'Farmers' Day' was celebrated on December 26, 1986 at TNAU, Coimbatore.

The second part of the Lab-to-Land programme Phase IV was inaugurated by Dr. V Rajagopalan, Vice-Chancellor on January 2, 1987.

An International symposium on 'Ganoderma Wilt Diseases on Palms and Other Perennial Crops' was held on January 6-8, 1987 at TNAU, Coimbatore.

A three-day national symposium on 'Nuclear and Allied Techniques in Research on Soil Fertility and Fertilizer Usage' was held on January 21, 1987 at TNAU, Coimbatore.

The twelfth Convocation of the University was held on January 28, 1987 at TNAU, Coimbatore.

The XIV annual workshop of AICRP on 'Harvest and Post-Harvest Technology' was held on February 10-13, 1987 at TNAU, Coimbatore.

A training on 'Livestock Production, was organised for pre-release defence personnel by the Directorate of Extension Education from 5th January to 4th February, 1987 at TNAU, Coimbatore.

A training programme on 'Plant Protection' was organised for the pesticide dealers on January 21-22, 1987 at TNAU, Coimbatore.

A training programme on 'Fish culture in Farm Ponds' was conducted at TRRI, Aduthurai on January 29, 1987.

A training on 'Ecological Agriculture' was organised for the participants of an international course on 'Agriculture-Man-Ecology' on February 3-6, 1987 at TNAU, Coimbatore.

A workshop on 'Biological Control of Plant Diseases' was held on March 10, 1987 at TNAU, Coimbatore.

The 'Farmers' Day' was celebrated at TRRI, Aduthurai on February 16, 1987.

A national seminar on 'Bio-gas Technology' was conducted on March 3, 1987 at TNAU, Coimbatore.

The 'National Science Day' was celebrated on February 28, 1987 at TNAU, Coimbatore.

A six-day training on 'The Application of Agrciultural Sciences, Technology and Extension for the Forest Productivity' was organised for the Indian Forest Service Officers on March 16, 1987.

Regional Research Council Meetings of the North-Eastern Zone were conducted on June 12-13, 1986 and Januaty 2-3, 1987 at Regional Research Station, Vridhachalam.

Important visitors

A World Bank Team comprising of Dr. Motiramani, Dr. A. R. Seshadri and Mr. Golgali visited the Agricultural Research Station, Kovilpatti on February 26, 1986 for finalising the NARP Phase II.

Mrs. Khurana, wife of His Excellency, the Governor of Tamil Nadu visited TNAU, Coimbatore on June 4, 1986.

A World Bank Team comprising of Mr. Lordon, Director of South Asia Region, Mr. Michael Benor, Mr. Hall, Mr. Richard Grimshaw, Mr. Bredero and Mr. Narayanamoorthy visited Regional Research Station, Paiyur on June 30, 1986.

Six plant protection experts from Vietnam visited TNAU, Coimbatore from September 1-10, 1986.

Dr. Indur Fagoonee, Department of Entomology, University of Mauritius visited TNAU campuses at Coimbatore and Madurai from September 9-12, 1986.

The Hon'ble Union Minister for Agriculture and Rural Development, Dr. G. S. Dhillon visited Tamil Nadu Agricultural University, Coimbatore on October 17, 1986 He declared open the laboratory for pulses research constructed at a cost of Rs. 5.30 Lakhs. He also declared open the NARP building complex at Regional Research Station, Paiyur on October 18, 1986.

Dr. G. L. Kaul, DDG (Horticulture), ICAR released a book entitled 'Genetics of Heterotic Systems' on October 17, 1986.

A team of 15 scientists of the programme committee of the Governing Body of ICRISAT accompanied by Dr. L. D. Swindale, Director General of ICRISAT visited TNAU, Coimbatore on October 10, 1986.

A U. S. Team under Indo-U. S. collaborative programme of National Bureau of Plant Genetic Resources, New Delhi visited TNAU, Coimbatore on October 10, 1986.

Dr. John W. Mellor, Director, International Food Policy Research Institute, Washington addressed the Social Scientists of Tamil Nadu Agricultural University on December 10, 1986 at Coimbatore.

Dr. B. F. Blake, First Secretary, Science and Education, British Deputy High Commission addressed on the inauguration day of the workshop on

'Molecular Biology' held on December 8, 1986 at TNAU, Coimbatore.

Honourable Shri Harminder Singh, Minister of Transport visited the University orchard and Cotton Breeding Station, TNAU, Coimbatore on December 29, 1986.

Shri William Odango Omamo, Minister for Agriculture and Livestock Development, Kenya was the Chief Guest of the twelfth convocation of the University and delivered the convocation address on January 28, 1987.

Dr. G. Edward Schuh, Director of Agricultural and Rural Development visited the CARDS, TNAU, Coimbatore on March 7, 1987.

Dr. D. S. Thornton, Professor of Agricultural Economics, University of Reading, U. K., visited the CARDS, TNAU, Coimbatore on July 11, 1986.

Dr. M. J. Robson, a British Scientist, visited TNAU, Coimbatore from 2nd to 18th February, 1987 and gave lectures *in Crop Physiology*.

A USAID team led by Dr Kenneth Charles Nobe visited the Water Technology Centre, TNAU, Coimbatore on January 28 and 29, 1987.

Dr. Mark Svendsen, IFPRI, USA visited TNAU, Coimbatore in February, 1987.

Dr. W. S. Tharnton, UNDP consultant for water resources and conservation, U. K. visited the water Technology Centre, TNAU, Coimbatore on July 14, 1986.

A five member delegation of USAID led by Dr. Ronald H. Pollock accompanied by Dr. Anwar Alam, ADG, ICAR visited TNAU, Coimbatore on August 14, 1986.

Awards

Dr. J. Krishnaiah and Dr. B. Sundara, Ph. D. students of Tamil Nadu Agricultural University in Agricultural Economics and Agronomy respectively were presented with Jawaharlal Nehru Award by the Government of India for the best *thesis research*.

FOREIGN VISITS

Foreign visits undertaken by the faculty during 1986-87

Sl. No.	Name of the Scientist	Country	Period	Programme
(1)	(2)	(3)	(4)	(5)
1.	Dr. C. Ramaswamy, Associate Professor (Agrl. Economics), Coimbatore.	Washington U. S. A.	15.4.86 to 15.5.86	Collaborative Research Project with IFPRI.

(1)	(2)	(3)	(4)	(5)
2.	Dr. Stephen Vinai Rai, Associate Professor (Forestry), Forestry Research Station, Mettupalayam.	Nairobi, Kenya	6.5.86 to 28.5.86	Agro-Forestry Training at ICRAF.
3.	Dr. D. Augustine Selvaseelan, Associate Professor (Soil Science), Water Technology Centre, Coimbatore.	Sweden	15.5.86 to 25.6.86	Guest Scientist at Royal Institute of Technlogy.
4.	Dr. S. Jayaraj, Director, Centre for Plant Protection Studies, TNAU, Coimbatore.	Manila, Philippines	9.6.86 to 14.6.86	Research Planning Workshop at I.R.R.I.
		Netherlands and Federal Republic of Germany	18.8.86 to 31.8.86	IV International Colloguim on Invertebrate Pathology at Veldhoven, the Netherlands and visit to the universities in F. R. G.
		Nairobi, Kenya	10.7.86 to 16.7.86	III International Neem Conference at ICIPE, Nairobi, Kenya.
5.	Dr. A. Kandaswamy, Director, CARDS, TNAU, Coimbatore.	Manila, Philippines	9.6.86 to 14.6.86	Research Planning Workshop at I.R.R.I.
6.	Dr. S. Sadasivam, Professor of Bio - Chemistry, Coimbatore.	U. S. A.	28.6.86 to 28.9.86	UNDP - FAO Training.
7.	Thiru R. Jambulingam, Associate Professor (Forestry), Forestry Research Station, Mettupalayam.	U. S. A.	31.7.86 to 30.7.87	Training in Tree Crops Genetics and Species Improvement.

(1)	(2)	(3)	(4)	(5)
8.	Thiru O. Anjanam Alagia Pillai, Associate Professor (Horticulture), Regional Research Station, Aruppukkottai.	U. S. A.	31.7.86 to 30.7.87	Training in Tree Crops Genetics and Species Improvement.
9.	Dr. N. M. Ramaswamy, Professor (Cytogenetics), School of Genetics, TNAU, Coimbatore.	Canada	1.4.86 to 30.3.88	Post Doctoral Training in Tissue Culture
10.	Dr. P. Vaidhyanathan, Associate Professor (Plant Breeding), Regional Research Station, Paiyur.	Thailand	4.8.86 to 10.9.86	Cowpea Production Training at Khon Kaen University.
11.	Dr. A. Abdul Kareem, Professor (Agrl. Entomology), Tamil Nadu Rice Research Institute, Aduthurai.	Manila, Philippines	7.8.86 to 6.8.87	Post Doctoral Training in Agrl. Entomology at I.R.R.I.
12.	Dr. M. Rangarajan, Professor of Agrl. Microbiology, Coimbatore.	Netherlands	18.8.86 to 21.8.86	III International Workshop on the measurement of Microbial activities at Niewersluis.
		Yugoslavia	24.8.86 to 29.8.86	IV International Conference on Microbial Ecology at Ljubljana.
13.	Dr. T. S. Manickam, Professor of Soil Science, Coimbatore.	U. S. A.	19.8.86 to 14.10.86	Joint INDO - U.S. Workshop Meeting at University of California Davis.

(1)	(2)	(3)	(4)	(5)
14.	Thiru V. Kumar, Assistant Professor (Soil & Water Conservation), College of Agrl. Engineering, Coimbatore.	Manila, Philippines	25.8.86 to 3.10.86	Training at I.R.R.I.
15.	Dr. N. Mohammed Sheriff, Associate Professor (Oilseeds), Coimbatore.	U. S. S. R.	18.8.86 to 12.9.86	Sunflower Training.
16.	Thiru G. Rajannan, Assistant Professor (Agrl. Microbiology), Coimbatore.	U. S. A.	13.9.86 to 31.3.87	UNDP-FAO Training at Michigan State University.
17.	Thiru K. Rajendran, Associate Professor (Agrl. Economics), Coimbatore.	U. K.	3.10.86 to 20.7.87	Training in Forestry Economics.
18.	Dr. A. Subramaniyan, Professor of Agronomy, Krishi Vigyan Kendra, Pondicherry.	Nigeria	22.10.86 to 22.12.86	Deputed to the University of Calabar.
19.	Dr. V. Subramaniyan, Dean, College of Agrl. Engineering, Coimbatore.	Beijing, China	9.11.86 to 12.11.86	First International Symposium on Fuel Efficient-Stoves.

(1)	(2)	(3)	(4)	(5)
20.	Thiru T. V. Job, Associate Professor, College of Agrl. Engineering, Coimbatore.	Manila, Philippines	16.11.86 to 5.12.86	Training at I.R.R.I.
21.	Dr. C. Surendran, Associate Professor (Forages), Coimbatore	Australia	6.1.87 to 13.4.87	Australian National University, Canbarra, Australia UNDP-FAO Training.
22.	Thiru T. N. Balasubramanian, Associate Professor (Agronomy), Agrl. Res. Station, Kovilpatti	Manila, Philippines	2.2.87 to 26.6.87	Training on Cropping systems Research at IRRI.
23.	Th. S.N.M. Ramachandra-Boopathy, Assoc. Professor (Agronomy), TNAU, Coimbatore.	Manila, Philippines	2.2.87 to 22.5.87	Training course on International Network on Soil Fertility and Fertilizer Evaluation fo Rice, at IRRI.

FINANCE AND ACCOUNTS

The following statement indicates the classified summary of the transactions of the University during 1986-87.

A. Income

Details		Amount (Rs. in lakhs)
Opening balance as on 1-4-86		121.85
Receipts		
I. State Grant		
a. Agriculture - Plan	475.00	
b. Agriculture - Non - Plan	258.00	
c. Veterinary - Plan	169.00	
d. Veterinary - Non - Plan	145.00	
e. Fisheries - Plan	35.00	
f. Fisheries - Non - Plan	—	
		1082.00
II. ICAR Grant		
a. Agriculture Research Schemes	213.49	
b. Development Grant	29.07	
c. Veterinary Research Schemes	34.02	
d. Grants to K. V. K., Pondicherry	5.52	
		282.10
III. Government of India Grant		36.97
IV. Outside Agencies		
a. Foreign and Indian Agencies Research Schemes	12.01	
b. National Service Scheme	0.40	
		12.41
V. Other Receipts (Fees, Rent, Farm Receipts, Loans and Advances)		
a. Agriculture	537.55	
b. Veterinary	72.14	
c. Fisheries	9.26	
d. State Government Loan for House Building Advance	15.00	
		633.95
TOTAL		2169.28

B. Expenditure

S. No.	Details	Amount (Rs. in lakhs)
1.	Agriculture - Non - Plan	591.66
2.	Agriculture - Plan	263.30
3.	Veterinary - Non - Plan	162.89
4.	Veterinary - Plan	150.79
5.	Fisheries - Plan	35.82
6.	ICAR Fully Financed Schemes - Agriculture	160.21
7.	ICAR Fully Financed Schemes - Veterinary	13.77
8.	ICAR Partly Financed Schemes - Agriculture	104.21
9.	ICAR Partly Financed Schemes - Veterinary	15.98
10.	Government of India Schemes	42.51
11.	Other agencies Schemes	16.77
12.	ICAR Development Grant	31.17
13.	Hill Area Development Programme	0.25
14.	TNAU Employees Pension Fund	61.34
15.	House Building Advance	15.00
16.	Krishi Vigyan Kendra, Pondicherry	5.52
17.	National Service Scheme	0.40
18.	Loans, Advances and Deposit Transactions	428.06
	TOTAL	2099.65
	Closing Balance	69.63
	GRAND TOTAL	2169.28

The Finance Committee at its 32nd meeting considered the proposal for the R E 1986-87 and B. E. 1987-88 of Tamil Nadu Agricultural University and recommended the estimates to the Board of Management. The annual audited accouts for the year 1985-86 was finalised and placed before the Finance Committee in the same meeting. As the accounts for 1986-87 are yet to be certified by the audit, the expenditure details furnished above are only unaudited and unreconciled figures.

Contribution of Outside Agencies

The following outside agencies contributed funds to carry out research as indicated against each during the year under report.

Name of the Agency	Name of the Research Project
1. IFFCO, New Delhi	Establishment of IFFCO chair
2. Potash Research Institute of India, Gurgaon	Maximisation of yield in rice
3. *DANIDA Mission, New Delhi,*	*Project on study on determinants* of selection, training needs and training methodology for farm women in six districts of Tamil Nadu.
4. Ford Foundation, New Delhi	Project on planning for rural future-An experiment

Prizes and Medals

The following prizes and medals were instituted during 1986-87.

Donor	Amount Rs.
1. ISAE Medal for B. E. (Ag) students	2900.00
2. W.P.A.R. Nagarajan, Pattiveeranpatti Medal for B. Sc. (Hort)	2500.00
3. Sathiavan Gopal Pillai Medal for B. Sc. (Ag)	1000.00
4. S. K. Mylswamy Gounder Prize for the best student in B. V. Sc. Poultry Science subject instituted by SKM Poultry Service and Marketing Centre, Erode.	10000.00
5. For the institution of FDR for the ECA grant (Amount received from the Dean, AC&RI, Madurai)	15024.11
6. Hon'ble William Odango Omama Award for the best M. Sc. (Ag) student in Agrl. Economics	10000.00

7.	Dr. G. V. Govindaswamy (Former Registrar) Award to the best B. Sc. (Ag) student in Plant Pathology	5000.00
8.	G. R. Varadarajulu Memorial Medal for the best B. E. (Ag) student of the University	5000.00
9.	Associated Agencies Medal for the best B. E (Ag) student of the University in Farm Machinery	2500.00
10.	Premier Irrigation Medal for the best B. E. (Ag) student in Soil and Water Conservation	2500.00
11.	Thiru B. M. Lakshmipathy Medal for the best B. E. (Ag) student in Agrl Processing	2500.00
12.	From the additional deposits for the institution of four prizes in Agrl. Entomology, Plant Pathology, Nematology and Weed Science	6000.00
13.	Prof. G. Rangaswami Prize for the best B. Sc. (Forestry) student instituted by M/s. Tan India Ltd., Kumarapalayam	5000.00
14.	Prof. G. Rangaswami Prize for the best student in M. Sc. Environmental Biology instituted by M/s. Tan India Ltd., Kumarapalayam	5000 00
15.	Prof. G. Rangaswami Prize for the best research worker in Transfer of Technology instituted by Prof. G. Rangaswami 60th Birth Anniversary Committee	5000.00
16.	Prof. G. Rangaswami Prize for the best M. Sc. (Ag) student in Microbiology instituted by Prof. G. Rangaswami 60th Birth Anniversary Committee	5000.00
17.	Prof. G. Rangaswami Prize for the best B. F. Sc student instituted by M/s. Vorion Chemicals, Ltd., Madras.	5000.00
18.	Prof. G. Rangaswami Prize for the best M. F. Sc. Student instituted by M/s. Vorion Chemicals Ltd., Madras.	5000.00
19.	S. K. David Mamorial Prize for the best B. Sc. (Ag) student instituted by Dr. Patric Yesudian	10000.00
20.	Gujarat Agro-Industries Prize for the best M. Sc (Ag) student in Agrl. Entomology instituted by Gujarat Agro-industries Corporation Ltd., Ahmedabad	5000.00

Hon'ble Kenyan Minister for Agriculture, Dr. W. Odango Omamo as the Chief Guest with His Excellency the Governor of Tamil Nadu Shri S. L. Khurana at the Twelfth Convocation of the University.

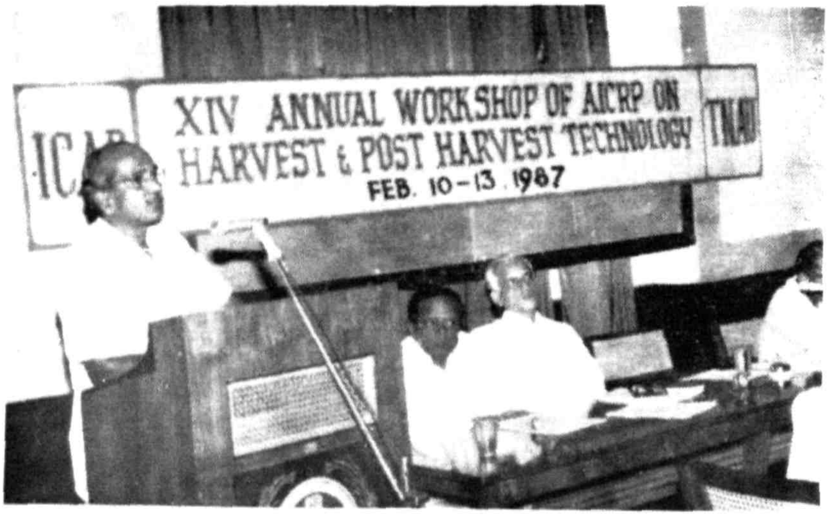
Hon'ble Union Minister for Agriculture and Rural Development Dr. G. S. Dhillon being Welcomed at the Regional Research Station, Paiyur.

F. A. O. Scientists from Vietnam in the Field

Visit of Thiru N. Athimoolam, I.A.S., Director of Agriculture, Madras to the Agricultural Research Station, Kovilpatti.

Hon'ble Minister of Pondicherry Thiru V. Govindarajan at the Central Exhibition of the Agricultural College, Madurai

Vice-Chancellor Addressing the Workshop on Biological Control of Plant Diseases.



Vice-Chancellor at the XIV Annual Workshop of AICRP on Harvest and Post-Harvest Technology at Coimbatore.

Mr. O. Sullivan, Canadian Coordinator for Dryland Agriculture, Hyderabad Visiting Agricultural Research Station, Kovilpatti.

Environment Education and Awareness Campaign at Kotagiri.

Dr. John W. Mellor at the Social Scientists' Meet at Coimbatore.

College Day at MVC, Madras - Hon'ble Thiru P. H. Pandian, Speaker Tamil Nadu Legislative Assembly Presenting Shield to the Student champion.

Inauguration of Screen House at Rice Research Station, Ambasamudram by the Vice-Chancellor

University Budget Estimate for 1987-88

Annual Financial Estimate of Tamil Nadu Agricultural University had been approved by the Finance Committee/ Board of Management for a gross appropriation of Rs. 1713.68 lakhs (including ICAR, GOI and other Agencies, loans and advances and deposit transactions).

In the budget estimate for 1987-88, a sum of Rs. 1092.18 lakhs was expected as grant from the State Government for implementing various education, research and extension activities. The grants from ICAR would be about Rs. 269.76 lakhs including ICAR Development Grant and NARP schemes. Grants of Rs. 36.96 lakhs and 12.05 lakhs were also expected from GOI and other Agencies respectively. Further, the anticipated University receipts would be about Rs. 218.46 lakhs approximately.

Audit

The audit certificates in respect of ICAR schemes and GOI schemes for 1984-85 were forwarded to ICAR and GOI respectively for almost all the schemes sponsored by them. The audit report of the Tamil Nadu Agricultural University for 1984-85 was approved by the Finance Committee and Board of Management. The general result of the audit was satisfactory

3. EDUCATION

AGRICULTURAL COLLEGE AND RESEARCH INSTITUTE, COIMBATORE

Dr. K. R. Ramaswamy continued as Dean (Agri) during the period under report. The college continued to offer B. Sc. (Agri), B. Sc. (Forestry), M. Sc (Ag) and Ph. D. degree programmes under the trimester system of education, besides offering courses for B. E. (Ag) and B. Sc. (Hort) degree progrmmes.

Admission

The number of students on roll in different classes of the degree programmes as well as the dates of commencement of the academic year 1986-87 for the different classes are furnished below:

Degree programme	Boys	Girls	Total	Date of commencement
I B. Sc. (Ag)	85	77	162	5.11.1986
II B. Sc. (Ag)	112	82	194	8.9.1986
III B. Sc. (Ag)	68	113	181	16.6.1986
IV B. Sc. (Ag)	97	34	131	16.6.1986
Total	362	306	668	
I B. Sc. (For)	15	5	20	5.11.1986
II B. Sc. (For)	17	3	20	8.9.1986
Grand Total	394	314	708	

Educational Tour

The students of III B.Sc (Ag) numbering 174 were on study tour in two batches during December 16 to 23, 1986. They visited Tobacco Research Station, Vedasanthur; Agrl. College and Research Institute, Madurai; Regional Research Station, Aruppukottai; Fisheries College, Tuticorin; Agricultural College, Killikulam; Agrl. Research Station, Thirupathisaram; Rice Research Station, Ambasamudram; Model Orchard cum Nursery, Courtallam; Cotton Research Station, Srivilliputhur; Palmyrah Researh Station, Srivilliputhur; Agrl. Research Station, Kovilpatti and Horticultural Research Station, Periyakulam.

The students of II B. Sc. (Ag) numbering 194 went on a study tour in two batches from 7th to 13th February, 1987. They visited Horticultural Research Station, Yercaud; Regl. Research Station, Vridhachalam; Krishi Vigyan Kendra, Pondicherry; Sugarcane Research Station, Cuddalore; Tamil Nadu Rice Research Institute, Aduthurai and Kumaraperumal Farm Science Centre, Tiruchirapalli.

An all India study tour was organised for the final B. Sc. (Agri) students from 22.3.87 to 12.4.87. The tour was conducted in two batches and the students were taken in two separate railway compartments specially arranged for them. The students visited important agricultural universities, and national and international institutions in the fields of agriculture and allied subjects. International Crop Research Institute, New Delhi; Indian Forest Research Institute and Indian Institute of Remote sensing, Dehradun were some of the important institutes covered under the tour.

Village Stay Programme

The final B.Sc. (Ag) and B.Sc. (Hort) students numbering 170 were placed in villages from 22.9.1986 to 23.10.1986 in Periyar, Dharmapuri, Salem and Trichy districts with a view to gain rural orientation and village experience. Altogether thirty-two locations were identified with 5-6 villages for each location. One student was assigned to each village. One staff member was incharge of two locations to guide the students. The students conducted field study with the help of a structured interview schedule and identified themselves with the farmers. Contact farmers were identified for the purpose of helping the students at the village level. The Students also conducted many method demonstrations. Newspapers and All India Radio gave wide coverage on the village stay programme. Several village meetings were organised by the students during their stay. They attended the fortnightly meetings of the training and visit personnel in the nearby headquarters to study the activities and functioning of the T & V system.

Scholarships

The details of scholarships awarded during 1986-87 are given below :

Details of the Scholarship	No. of recipients	Amount (Rs.)
National Merit Scholarship	22	34,940
National Loan Scholarship	4	4,600
National Foundation for Teachers' Welfare	1	500
State Scholarship for Teachers' Children	1	1,460
Scheduled Caste Scholarship	74	1,65,408
Adhoc Merit Grant for SC/ST	20	6,000
Bright Student Award	4	3,840
Scheduled Caste Loan Scholarship	68	34,860
Backward Class Scholarship	101	87,478
Backward Class Loan Scholarship	4	3,000
ICAR - HRDP - UG	9	26,400
Pondicherry State Scholarship	16	44,105
Andhaman Nicobar Islands	4	8,480
Andhra Pradesh Govt	1	7,200
U. S. Aid (Agrl. Development Council)	1	9,000
General Cultural Scholarship Scheme	2	15,900
Commonwealth Scholarship Scheme	1	14,223
Educational Consultant India Ltd.	2	1,01,076
IDRC Fellowship	2	38,400
E. I. D. Parry Ltd., Madras	1	1,200
M/s. Potash Research Institute of India Ltd	1	5,950
M/s. Rhone Poulene Agro Chemicals Ltd. Bombay	1	25,000
M/s. Godrej Ltd.	2	19,200
M/s. Rashtra Chemicals Ltd.	1	25,000
ICAR Junior and Senior Fellowships	86	9,31,187
TNAU Merit Scholarship (UG and PG)	112	1,21,827
Agrl. Microbiology Fellowship (PG)	6	52,910
ICAR Scheme Fellowship (PG)	3	35,799
Interest		28,091
Total		18,56,034

Students' Hostel

Dr. SP. Palaniappan, Professor and Head of the Dept. of Agronomy was the Warden upto 31.1.1987 and Dr. G. Perumal, Professor and Head of Dept. of Agricultural Extension and Rural Sociology took charge of the post on 12.2.87. The Warden was assisted by six Deputy Wardens, one Assistant Accounts Officer and other clerical staff in the functioning of the hostels. During the year 1986 - 87 the total number of students residing in the University hostels was 1260, including 458 girl students.

The student representatives, nominated by the Warden in consultation with the students, were running the messes efficiently. Regular meetings of the mess representatives were held to discuss the points for smooth management of the messes. There were two students' canteens functioning in the hostels, one exclusively at the girls hostel. The students' canteens were run on no-loss-no-profit basis. The Canteen Committee met at frequent intervals to review the functioning and offered suggestions for further improvement.

All the policies and administrative decisions were taken by the Student Welfare Committee, headed by Dr V. D. Guruswamy Raja, Dean, (P. G. Studies). The hostel accounts were placed in the Student Welfare Committee for approval. During the year the Student Welfare Committee met five times.

During the year under report the following improvements were made in the hostel :

a) All the electrical fittings, pipelines, windows and doors were repaired.

b) Furniture and vessels were purchased for nearly Rs. 25,000/-.

c) The reading room existing in different hostels were equiped with furniture and supplied with journals and newspapers.

d) A new mess was opened in the women's hostel.

Two University Medical Officers (one of them being a lady doctor) provided medical services to the inmates of the hostels. A separate medical room was provided in the women's hostel.

Students' Club

The activities of the students' club for 1986-87 were inaugurated on 21.9.1986 by Dr. V. Rajagopalan, Vice-Chancellor of Tamil Nadu Agricultural University, Coimbatore. The activities of the club were co-ordinated by the Staff Adviser, the Physical Director and the concerned Staff Associates.

The Orientation day and carnival show for the first year students were held on 6.12.86. The activities of Social Service League were inaugurated by Dr. V. D. Guruswamy Raja, Dean (P.G. Studies) and the league carried on brilliantly the task of teaching and guiding the poor children. The Air India debating contest was held for the students of all the colleges of the University on 11.2.87 at the main campus.

The Arts and Photographic Society conducted a photography and art exhibition in which the talents of the students were portrayed. TNAU main campus Orchestra team participated in 'Festembers' 1986, a State Level Cultural Competition, conducted at Regional Engineering College, Trichy on 26th and 27th September, '86. It also took part in 'Harmony' 1986, another State Level Festival, held at C. I. T. from 15th to 17th August, 1986. The college team won first prize in light music. TNAU inter-collegiate cultural competitions were conducted on 19.11.86 at the main campus.

Sports and Games

The University teams in basketball, cricket, kabaddi, tennis and football participated in the South Zone inter-university tournaments and also in the various inter-collegiate tournaments.

The University cricket team participated in the matches organised by the Coimbatore District Cricket Association and also in the Rajaji memorial State level tournament. The college football team won second prize in the inter-collegiate football tournament held at Southern Forest Rangers College, Coimbatore. In hockey, Thiru A. Raviraj, II B. E. (Ag) student was selected to represent Coimbatore Junior Hockey team. Thiru Senthilkumar, IV B. Sc (Ag) student won first prize in the weight lifting competition conducted by Janaranjini Sports Club, Coimbatore.

National Cadet Corps

The regular NCC parades for the year 1986-87 commenced during May, 1986. The training activities included (a) Drill (b) Weapon training (c) Map reading (d) First aid and civil defence (e) Field craft (f) Organisation of infantry battalion (g) Trekking etc.

The NCC cadets of this University presented a march past during the Annual Sports Day Celebration and won the first prize. During Convocation held at Bharathiar University 13 cadets of TNAU participated in the Guard of Honour parade extended to the Governor of Tamil Nadu.

CVO. E. Suburayalu, III B. E. (Ag) participated in the basic leadership camp held at Kakkinada from 30.5.86 to 12.6.86.

The National Integration week was observed on 18.10.86 and the NCC cadets of the University along with the NCC Officer Lt. Dr P. Rajasekaran took part in the peace march organised during that occassion.

Cpl A. Sivakumaran and Cpl. S. Sadhishkumar, the NCC cadets of this University took part in the All India Trekking expedition held at Winzar, Pune, from 27.11.86 to 14.12.86. Twenty cadets and one officer of this University attended Annual Training camp held at Duraisamy Gowder Higher Secondary School at Seeliyur from 24.12.86 to 4.1.87.

The NCC day was celebrated at Police Recruitment School ground, Coimbatore on 10.1.87. On that occasion Colonel Commandent rank was conferred on Dr. V. Rajagopalan, Vice-Chancellor, by Commodore Mohan Vergheese, Dy. Director General, NCC Tamil Nadu and Pondicherry. The group Commander Col. V. P. Rostogi was also present on that occasion..

A guard of honour parade was organised during 12th Annual Convocation of the University. The Honourable Minister for Agriculture and Dairy Development, Government of Kenya, Mr. W. Odango Omamo took the salute. His Excellency Thiru S. L. Khurana, Governor of Tamil Nadu inspected the guard of honour.

The cadets from the University took part in the 'B' and 'C' certificate examinations and the results are awaited.

National Service Scheme

The National Service Scheme continued to function during 1986-87 with 700 volunteers. An exclusive NSS unit for girls at Agricultural College, Coimbatore was established during the year.

The volunteers actively participated in the various activities organised during the year. Specific activities to suit the interests of the volunteers from different faculties were organised. Planting of avenue and economic tree seedlings, soil and pest survey in villages and suggesting suitable solutions were the important programmes for volunteers from agricultural faculty. Similarly, volunteers from college of agricultural engineering participated in popularising farm machinery, agricultural implements and also in spreading knowledge on non-conventional energy sources. Apart from the above specific programmes, the volunteers were also involved in general activities like collection of used clothes and distributing them to the needy poor, campus cleaning and participation in all the important functions held in the campus.

COLLEGE OF HORTICULTURE, COIMBATORE

Dr. K. R. Ramaswamy held the post of Dean, Faculty of Horticulture (Additional Charge) up to 15.4.1986. Dr. K. G Shanmugavelu joined as Dean (Hort) on 16.4.86 and continued during the period under report. The Faculty of Horticulture continued to offer B.Sc (Hort), M.Sc (Hort) and Ph.D. degree programmes under the trimester system of education. The Faculty also offered courses to B Sc (Ag) and B.Sc (Forestry) degree programmes.

Admission

The College reopened on 8.9.86 for II and III year classses and on 16.6.86 for IV year. The first year classes commenced on 5.11.86. The number of students on roll in 1986-87 was as follows :

Year	Boys	Girls	Total
I B.Sc (Hort)	30	30	60
II B.Sc (Hort)	25	30	55
III B.Sc (Hort)	20	19	39
IV B.Sc (Hort)	23	18	41
Total	98	97	195

Educational tour

The final B.Sc (Hort) students were on All India study tour from 24.3.87 to 11.4.87. They visited Indian Institute of Horticultural Research and University of Agricultural Sciences at Bangalore; Arey Milk Colony and Tata Institute of Social Research at Bombay; Indian Agricultural Research Institute, New Delhi; Haryana Agricultural University,

Hissar; Indian Forest Research Institute, Dehra Dun; ICRISAT, Hyderabad; and Madras Veterinary College and Poultry Research Station, Madras to gain knowledge about different research and extension programmes in operation in India.

They also visited Horticultural Research Station, Yercaud for practical training in coffee cultivation from 13.12.86 to 30.12.86, and the Nilgiris on 17.5.86 for the study of temperate fruits, vegetables and flower cultivation.

The third year B.Sc. (Hort.) students went to Horticultural Research Station, Yercaud for plantation training in coffee cultivation from 2.2.87 to 27.2. 87.They also went to Coonoor and Ootacamund for the study of fruit crops.

Village Stay Programme

The final B.Sc. (Hort.) students numbering 41 underwent village stay programme and were distributed in the following villages:

Place	District	Number of students
Kavanoor	Coimbatore	5
Sathiyamangalam I	Periyar	6
Sathiyamangalam II	Periyar	6
Ayothiapatnam	Salem	6
Athur	Salem	6
Thimmapuram	Dharmapuri	6
Krishnagiri	Dharmapuri	6
	Total	41

Scholarships

The details of scholarships awarded during 1986-87 are given below:

Details of the Scholarship	Number of recipients
1. Adidravidar Welfare Scholorship	18
2. Backward Class Welfare Scholarship	33
3. Adidravidar Welfare Loan Scholarship	18
4 Gandhi Memorial Scholarship	1
5. National Merit Scholarship	4
6. Goderj Soap P. Ltd Jr. Fellowship	1
7. Colombo Plan Stipend (Ph. D. Student)	1
8. ICAR Merit cum Means Scholarship (UG Students)	2
9. ICAR Junior Fellowship	4
10. ICAR Senior Fellowship	2
11. Ad-hoc Merit Scholarship	1
Total	85

COLLEGE OF AGRICULTURAL ENGINEERING, COIMBATORE

Dr. V. Subramaniyan continued to be the Dean during the peried under report. The Faculty offered B. E. (Ag.) degree programme and M.E. (Ag.) degree programmes in Farm Power Machinery, Soil and Water Conservation Engineering, Post-harvest Technology and Agro-Energy and Power besides offering courses in agricultural engineering for B.Sc. (Ag), B.Sc (Forestry) and B.Sc (Hort) students, Doctoral programme was also started in 1986-87.

Admission

One hundred and three students were admitted to I B. E (Ag) course. The first trimester for the I B.E (Ag) commenced on 5.11.86 and for the II, III and final B. E (Ag) on 18.12.86, 10.11.86 and 1.12.86 respectively. The number of students on roll in I, II, III and IV year B.E (Ag) was as follows:

Class	Boys	Girls	Total
I B. E (Ag)	82	21	103
II B. E (Ag)	79	17	96
III B. E (Ag)	68	7	75
IV B. E (Ag)	67	5	72
Supplementary students	19	1	20
Total	315	51	366

Educational Tour

a. State Tour

The III B. E. (Ag) students, were on tour from 7.7.86 to 15.7.86 and they visited the following industries and institutions in Tamil Nadu:

M/S Seshasayee Paper and Boards limited, Erode; NAFED Processed Foods, Vellore; Institute of Hydraulics and Hydrology, Poondi; 'J' Farm, Madras; Murugappa Polytechnic, Madras; Drip Irrigation Farm at Vandalore, Madras; Neyveli Lignite Corporation, Neyveli; Fisheries College, Tuticorin; Southern Petro - chemical Industries Corporation Ltd., Tuticorin and Parasakthi College, Courtallam.

b. All India Tour

The final year students went on an All India study tour from 14.7.86 and they visited the following institutions and industrial organisations in India :

a) M/s V. S. T. Tillers Ltd., Visweswaraya Industrial and Technology museum, M/S National Seeds Corporation and University of Agricultural Sciences at Bangalore.

b) Coastal erosion at Goa

c) M/S International Tractors, Marine drive, RCC protection walls against sea erosion, M/S American springs and Processing Works and Arey Milk Colony at Bombay.

d) Central Soil Conservation Centre for Research and Training and Central Forest Research Institute at Dehra Dun.

e) Water Technology Centre, Indian Agricultural Research Institute, M/S Eicher Good Earth Ltd., M/S Frick India Ltd., and Indian Institute of Technology at New Delhi.

f) Central Plant Protection Training Institute, Andhra Pradesh Agricultural University and ICRISAT at Hyderabad.

Practical Training

The III B E (Ag) students were on practical training from 5.11.86 to 28.11.86 in the following organisations :

a) M/s TEXMO Industries, Coimbatore
b) Government Tractor Workshop, Coimbatore
c) Office of the Executive Engineer (Agrl. Engg), Coimbatore.
d) LBP River Valley Project, Coonoor.
e) Command Area Development Programme, Gobi

Scholarships

The details of scholarships awarded during 1986-87 are detailed below :

Details of Scholarship	No. of recipients
ICAR Merit Scholarship	16
National Loan Scholarship	1
Scheduled Caste Loan	44
Scheduled Caste Scholarship	46
Teachers' Welfare Scholarship	1
Backward Class Scholarship	63
TNAU Merit Scholarship	24
National Merit Scholarship	8
Govt. of Pondicherry Scholarship	2
Junior Fellowship	1
I. I. T. Scholarship	1
Ex serviceman Scholarship	1
Total	208

Students' Hostel

Prof. R. Manian, Senior Research Engineer of Zonal Research Centre was the Warden during the period and was assisted by two Deputy Wardens. The student office bearers were also selected to help in the functioning of the hostel. There were 334 students residing in the hostel during 1986 - 87 including 49 lady students in the ladies' hostel.

National Service Scheme

Thiru C. Diwakar Dorairaj, Asst. Professor, Department of Farm Machinery continued to be the NSS Programme Officer of the Engineering unit. There were 120 volunteers from this college in the National Service Scheme and they were involved in activities like weed control, parthenium eradication in the campus and formation of play grounds for volley ball and badminton in the hostel premises.

AGRICULTURAL COLLEGE AND RESEARCH INSTITUTE, MADURAI

Dr. T. Kumaraswami continued as Dean during the period under report. There were 14 departments, ten under the faculty of Agriculture and four under the faculty of Basic Sciences and Humanities The Dean was assisted by an Administrative Officer and an Accounts Officer in office administration and a Warden, three Deputy Wardens and one tutor in the hostel administration.

The college offered B. Sc degree programmes in Agriculture, Horticulture and Home Science and post-graduate programmes in Agriculture, Horticulture, and Food Science and Nutrition under the trimester system of education.

Admission

The number of students on roll during 1986-87 :

Class	Number
I B. Sc (H. Sc)	11
II B. Sc (H. Sc)	14
III B. Sc (H. Sc)	8
I B. Sc (Ag)	95
II B. Sc (Ag)	88
III B. Sc (Ag)	119
IV B. Sc (Ag)	89
I M. Sc (Ag)	49
I M. Sc (Hort)	7
I M. Sc (FS & N)	3
II M. Sc (Ag)	44
II M. Sc (Hort)	3
II M. Sc (FS & N)	3
Total	533

Educational Tour

II B. Sc (Ag) students were on educational tour in two batches to research stations at Periyakulam, Kodaikanal, Srivilliputhur, Kovilpatti, Tirunelveli, Thirupathisaram, Aruppukottai and Paramakudi and also to the Fisheries College, Tuticorin from 5.1.87 to 10.1.87.

III B.Sc (Ag) students were on educational tour to research stations at Vedasanthur, Aliyarnagar, Mettupalayam, Ooty, Bhavanisagar, Vridhachalam, Aduthurai, Trichy and Pudukottai and also to the main campus at Coimbatore from 14.12.86 to 20.12.86.

The final B. Sc (Ag) students went on an All India study tour from 21.2.87 to 13.3.87. The students visited Madras Veterinary College, Madras and various agricultural universities and research centres at Hyderabad, Bombay, New Delhi and Bhubaneswar.

The final B. Sc (Home Science) students were on educational tour to Gandhigram Rural Institute, the main campus at Coimbatore and Ooty from 24.2.87 to 26.2.87.

Village Stay Programme

The final B. Sc (Ag) students participated in the Village Stay Programme for one month from 30.12.86 to 28.1.87.

Scholarships

Details of scholarships awarded during 1986-87 are given below :

Details of scholarship	Number of recipients		
	U.G.	P.G.	Total
Adidravidar Welfare Scholarship	53	–	53
Backward Class Welfare Scholarship	67	–	67
Adidravidar Welfare (Andhra pradesh) Scholarship	–	1	1
Adidravidar Welfare Loan Scholarship	53	–	53
D. N. T. Scholarship	2	–	2
ICAR Merit Scholarship	5	–	5
ICAR Junior Fellowship	–	26	26
Agri. Merit Scholarship	42	12	54
National Merit Scholarship	30	–	30
Pondicherry State Scholarship	6	–	6
Ex-servicemen Welfare Scholarship	1	–	1
Aspee Agricultural Research and Development Foundation Scholarship	–	1	1
Spic Ltd. Scholarship	–	1	1
Indian Explosive Ltd. Scholarship	–	2	2
Farmers' Committee Fund Scholarship	1	–	1
S. J. Tindel Trust Scholarship	1	–	1
Arunachal Pradesh Scholarship	–	1	1
Bright Students' Award	4	–	4
Gandhian Memorial Award Scholarship	1	–	1
Adhoc Merit Grant	5	–	5
National Loan Scholarship	6	–	6
Total	277	44	321

Students' Hostel

Dr. S. Ramiah, Professor and Head, Department of Agronomy was the Warden from 1.4.86 to 13.6.86 and Dr. S. Gopalsamy, Professor and Head, Department of Soil Science and Agricultural Chemistry was the Warden from 14.6.86. The Warden was assisted by three Deputy Wardens and one tutor. Selvi G. Manimegalai, Associate Professor and Head, Department of Home Science and P. Banumathi, Assistant Professor of Food Science and Nutrition were the Deputy Warden and tutor respectively for the ladies' hostel.

There were 460 students residing in the hostel during 1986-87. Medical facilities to the inmates of the hostel were provided by a full time Medical Officer.

Students' Club

The inaugural function of the Students' Club activities for 1986-87 was held on September 21, 1986. The 'Orientation Day' for the freshers was conducted on 11.11.86. 'Talentia '87, an inter-collegiate competition, was celebrated on 19th and 20th February, 1987 and all the city colleges of Madurai took part in the competition. The Muthamil Vizha for 1987 was celebrated from April 2 to 4, 1987. Thavathiru Kundrakudi Adikalar delivered the inaugural address. The Hiking Society conducted cycling expedition to Thondi and twenty-five students participated in the trip covering a distance of about 380 km.

Sports and Games

The inter-collegiate hockey tournament for 'Deans Trophy' was conducted by the College on 28th and 29th March, 1987.

The twenty second annual 'College Day Sports Meet' was held on 23rd April, 1987. Thiru I. K. Govind I.P.S. Deputy Inspector General of Police, Madurai, addressed the gathering and distributed the prizes.

The College Criket Team won most of the matches in the 'B' Division league. The performance of the team was very much appreciated by the press and public.

Two students in hockey, three in cricket, two in basket-ball and one in Kabaddi represented the University teams and participated in various inter-university tournaments. Special training classes in Karate were also conducted for the students.

National Cadet Corps

Forty cadets belonging to different classes of B.Sc (Ag) and B.Sc (H.Sc) were enrolled during the period. Thirty NCC cadets led by Capt. S. Subramanian, NCC Officer, took up a cycle expedition to Gudalur covering a distance of 270 km.

SQ. M. Govindarajan, student of third B.Sc (Ag) class attended the All India Trekking Expedition at Gen from 30th September to 24th October, '86. Four cadets participated in the special combined Annual Training Camp at Marthandam from 9th to 20th June, 1986. Two cadets attended combined Annual Camp at Ambasamudram and ten cadets attended combined Annual Training Camp at Marthandam from 24th December, 1986 to 4th January, 1987.

Ten cadets actively participated in the march past during the NCC Day celebration held on 31st January, 1987 at Reserve Line grounds, Madurai. Twelve cadets appeared for 'B' certificate examination held at American College, Madurai and all of them passed the examination.

National Service Scheme

Dr. T. Kumaraswami, Dean of the College continued as Chairman of the National Service Scheme unit of the College. One NSS unit consisting of 100 student volunteers actively participated in the following activities:

a) Assisted the reception committee during the Farmers' Day celebration and guided and helped the orderly distribution of food packets and other items.

b) Actively participated in regularising the track and field events on the Sports Day.

c) Guided the candidates who appeared for Tamil Nadu professional courses entrance examination conducted in July, 1986.

d) The NSS volunteers dug pits and planted *Acacia arabica* seedlings behind boys hostel on 13.12.86. They also planted 300 seedlings on the banks of Sitampatty tank on 13.12.86

e) The annual NSS camp for the year 1986 was conducted at Kathakinaru village (adcpted by Sathya Saibaba Samiti) from 18.10.86 to 25.10.86 and 35 students and three villags youths undertook the following services:

i) A katcha road from main road leading to village was formed and strengthened.

ii) They assisted the Samiti members in raising a culvert in the village.

iii) A pest survey was conducted by the student volunteers.

iv) The volunteers educated the village folks on improved cultivation practices, hygiene and health care and taking soil samples.

AGRICULTURAL COLLEGE, KILLIKULAM

Dr. T. K Kandaswamy continued to hold the post of Dean (Agri). The College continued to offer B.Sc (Ag.) degree programme under the trimester system of education.

Admission

The academic year commenced for the II B.Sc (Ag) class on 10.9.86 and for the III B.Sc (Ag) on 8.7.86. The first trimester for the I B.Sc. (Ag.) commenced on 5.11.1986. The number of students on roll during 1986-87 is given below:

I B.Sc (Ag)	100
II B.Sc (Ag)	89
III B.Sc (Ag)	84
Total	273

Educational Tour

The students of II B. Sc (Ag) went on an educational tour to research stations at Srivilliputhur, Agricultural College, Madurai and Fisheries College,

Tuticorin for six days. The III B. Sc (Ag) students undertook an educational tour for seven days to research stations/farms at Vamban, Aduthurai, Cuddalore, Vridhachalam, Bhavanisagar, Mettupalayam, Kudumianmalai and Appakudal and also the University main campus, Coimbatore.

Scholarships

The details of the scholarships awarded during 1986 - 87 are given below :

Details of Scholarship	Number of recipients			
	I year	II year	III year	Total
Backward Scholarship	39	23	27	89
GOI Scholarship	20	15	16	51
Pondicherry State Scholarship	11	7	—	18
Scheduled Caste Loan Fellowship	21	17	—	38
National Scholarship	3	1	—	4
National Loan Scholarship	1	—	—	1
Bright Students' Award	1	—	—	1

Students' Hostel

New hostel buildings at Killikulam campus started functioning from 15.12.86 and the III B. Sc (Ag) students were accommodated. The I and II B. Sc (Ag) students were accommodated at M. D. T. Hindu College campus hostel. The day-to-day activities of the hostel were looked after by a Warden assisted by two Deputy Wardens. The students were provided with all modern amenities at Killikulam hostel. All the policies and administration decisions concerned with the hostels were taken by the Students Welfare Committee with the Dean (Agri) as the Chairman.

Students' Club

The students' club inaugural function was held on 3rd January, 1987 and Thiru R. Arumugam I. A. S., Collector of Chidambaranar District was the Chief Guest. The club day and sports day celebrations were held on 24.5.86. The students took part in various cultural programmes organised by Government Engineering College and the Rotary Club of Tirunelveli. The award for the best design for the District Science Centre was prepared by Mr. S. Mahesh Babu of third year. The students won many prizes in the cultural programmes organised by the District Science Sammelan and also in the quiz programmes organised by Oil and Natural Gas Commission and Tirunelveli Medical College.

The students annual sports day celebration was organised and 15 athletic events and nine games were conducted during March, 1986. By Shramdhan, the students laid out a cricket pitch and a badminton court.

Two students of this college represented University teams (one in foot ball and the other in Kabaddi) and they participated in the inter - university tournaments.

National Service Scheme

The National Service Scheme of Agricultural College, Killikulam had been functioning with one hundred students The volunteers cleaned the surrounding of C. M. N. M. P. Centre, Killikulam and planted saplings. Seven students of NSS donated blood at Tirunelveli Medical College. The volunteers participated in the 'Rodent Control Campaign' held at Murappanad Village and demonstrated to the farmers about rodent control. The volunteers also attended to developmental works at Agricultural College hostel and prepared play grounds and venues.

National Cadet Corps

Arrangements were made with the Deputy Director General, NCC command at Madras for starting a separate NCC Battalion for the Agricultural College, Killikulam and the final orders are awaited.

Library

The library at Killikulam campus was equipped with 300 books to start with, and arrangements were made to purchase new text books, magazines and journals for the benefit of students and staff.

MADRAS VETERINARY COLLEGE, MADRAS

Dr. P. Kothandaraman continued as Dean of the college during 1986-87. The college offered B.V.Sc, M.V.Sc., and Ph. D degree programmes in the field of Veterinary and Animal Sciences under the trimester system of education.

Admission

During the year under report 146 students were admitted in B. V Sc, 29 in M. V. Sc and 18 in Ph. D degree courses. The dates of commencement of various classes are given below:

Class	Date of Commencement
I B.V.Sc	5.11.1986
II B V.Sc	22.11.1986
III and IV B.V.Sc	16.10.1986
V B V.Sc.	26.12.1986
M.V.Sc and Ph.D	25.2.1987

Educational Tour

The final year B. V. Sc students went on an All India study tour in two batches from 14 7.87 to 11.8.87. Indian Veterinary Research Institute, Central Avian Research Institute, Sheep Farm at Nainital, Pant Nagar Agricultural University, Mukteswar Research Institute, Pasumina Goat Farm, ICAR, IARI, National Institute of Immunology, NDRI at Karnal, Madhura Veterinary College, Regional Institute of Biological products and Veterinary polytechnic at Jaipur, All India India Institute of Medical Science, National Institute of Communicable Diseases, National Dairy Development Board at Anand, Arey Milk Colony at Bombay and Serum Institute and Punawala stud Farm at Pune were the institutes visited by them.

Scholarships

The details of scholarships awarded during 1986-87 are given below :

Details of scholarship	No. of recip-ients	Amount Rs.
Government of India	87	1,78,316
ICAR Scholarship	42	61,445
State Government (SC, ST, BC, etc.)	181	1,39,392
TNAU Merit Scholarship	29	28,200
S. J. J. Educational Trust Scholarship, New Delhi	1	2,700
	340	4,10,053

Students' Hostel

Dr. V. Ulaganathan, Professor and Head, department of Animal Genetics, served as Warden. He was assisted by three Deputy Wardens, one Assistant Accounts Officer and two clerical Assistants.

The total number of inmates in the hostels was 527, consisting of 471 men and 56 women students. A new block with 32 rooms was constructed in 1986-87 which could accommodate 64 students.

Two messes were run to cater to the needs of the inmates under dividend system. These messes were run by the mess secretaries and auditors elected from among the students by drawal of lots. The working of the mess was guided and supervised by one Deputy Warden. Replacement of taps, repairs to drainage system and replacement of fans in the mess halls were carried out during the year.

A canteen providing snacks, coffee, tea and milk was functioning to meet the students' needs. The canteen was also run by student representatives.

Two television sets, one in the men's hostel and the other in the women's hostel, provided entertainment to the students. Thirty-six new cassettes for the tape recorder were purchased and five cinemas screened in the hostel premises during the year.

The reading room in the hostel was provided with nine dailies and 12 magazines which were read by the students with great interest.

The Students Welfare Committee regularly met and the general functioning of the hostel was periodically reviewed. All efforts were initiated to protect the welfare of the students.

A Medical Officer visited the hostel about 10 times a month to take care of the students' health. To provide hygienic conditions, periodic cleaning and disinfection of the campus were undertaken by the staff of the hostel. The help of corporation authorities was also sought for the fumigation of the entire campus when a suspected case of chicken pox was observed.

Students' Club

Three magazines viz., Vets' time, Mag Vet and *Mullai Malar* were brought out by the students. International year of peace and understanding was celebrated by the students and during the occasion various competitions were held. The students also celebrated 'National Science Day', and an exhibition was organized in this connection. One student of the college representing

World University Service visited Europe. The students participated in various competitions held by Indian students' Islamic Movement; Youth Forum for Gandhian studies; International youth Forum; Lions Club, Madras; social and cultural Academy; Indo-American Association; Soviet Cultural Academy etc., One student of the college represented TNAU in the Inter-university elocution competition held at Wardha and won second prize. The students also participated in the inter-collegiate cultural meets organized by TNAU, Coimbatore; Madras Institute of Technology; Indian Institute of Technology; Cresent Engineering College; Lady Vaisnava College; Stella Maris College and Women's Christian College. An inter-collegiate festival called VETFEST '85 was organized by the College.

Sports and Games

Dr. P. Mahalingam, Ph. D. continued as Sports Secretary for the year 1986-87. The College teams in different games participated in the inter-collegiate tournaments conducted by I. I. T., Madras; Anna University; Madras Gurunanak College and Dr. A. L. Mudhaliar Sports Meet during the year.

The College players in foot-ball, baskstball, Kabaddi and cricket participated in the Tamil Nadu Agricultural University teams selection trials held at Coimbatore during November and December, '86 in connection with the participation in the South Zone inter-university tournaments. Thiru D. Sundararaj, Physical Director was nominated as the officer in-charge of TNAU foot-ball team in the inter-university tournament (South Zone) held at Kerala University, Trivandrum during November, '86.

The intra-mural tournaments in all the major games for men and women students were conducted and the students took active part.

The College Annual Sports Meet was conducted on 16.7.86 and prizes were distributed.

Madras Veterinary College Sports Festival was organised in February, 1987 and inter-collegiate tournaments were conducted in hockey, basket-ball, volley ball and ball badminton. Teams from the city colleges; TNAU, Coimbatore; Agricultural College, Madurai and Fisheries College, Tuticorin took part in the tournament.

National Service Scheme

The National Service Scheme unit of Madras Veterinary College carried out social service activities in Hasthinapuram, the adopted village near Madras. The student members of NSS unit visited Hasthinapuram village continuously and vaccinated the fowls of the farmers against contagious diseases. The details of vaccinations given were as follows :

Vaccine	Number of fowls
R. D. V. F. vaccine	4850
P. P. V. vaccine	5262
R. D. V. K. vaccine	1038
Total	11150

Steps were also taken by the NSS to establish a *Madhar Sangam* at Hasthinapuram village.

National Cadet Corps

The strength of the NCC unit was 170 in 1986-87. Ten cadets attended the Army Attachment Training programme at New Delhi from October 15 to November 4, 1986 and 58 cadets attended the combined Annual Training Camp at Madras from December 24, 1986 to January 4, 1987. The NCC officer, Dr. D. Kathiresan, attended a refresher training-cum-promotion course at Meerut for one month. Twenty-eight cadets of the College donated 250 ml of blood each to Red Cross Blood Donors Club, Madras. Out of the 49 cadets who had attended 'B' certificate examination, 46 were successful.

VETERINARY COLLEGE AND RESEARCH INSTITUTE, NAMAKKAL

Dr. R. Ramamurthi continued as Dean of the College. The College offered B. V. Sc. degree programme under the trimester system of education. Since the college was established only in 1985, only first and second year students were studying during the period under report.

Admission

During the year under report, 78 students were admitted in the I B. V. Sc class. Together with the 74 II B. V. Sc students, the total strength of students was 152.

Scholarships

The details of scholarships awarded during 1986-87 are given below :

Details of Scholarship	Number of recipients
Backward Class Scholarship	37
Harijan Welfare Scholarship	21
National Loan Scheme	2
Government of Pondicherry	1
Adhoc Merit Grant	10
Total	71

Students' Hostel

Accommodation was provided to the students in two hostels, one at Nallipalayam, 3km away from the campus housing 73 students and the other at Namakkal itself housing 71 students.

Students' Club

The National Science Day was celebrated on 28.1.1987 and the staff and students gave talks on the importance of science in day-to-day life.

Mr. Vivekanandan, I B. V. Sc won first prize in essay competition conducted by Institute for Road and Transport Technology, Erode.

A handwritten Tamil magazine, *Thenral*, was brought out by the students in October, 1987 under the guidance of the Dean.

College Day was celebrated on 1.10.1986. Dr. Venkatarajulu, Regional Joint Director of Animal Husbandry, Salem presided over the function and delivered the College Day address.

Sports and Games

Sports Day was conducted on 19.9.1986 at the grounds of Government Higher Secondary School Namakkal (South). The College cricket team participated in limited-over cricket match conducted by Venus Cricket Club, Namakkal and won the match.

National Service Scheme

The staff and students of the College took active participation in the NSS activities organised by the Government school, Namakkal (South) at Gurusamypalayam village.

FISHERIES COLLEGE, TUTICORIN

Dr. G. Jegatheesan continued as Dean i/c of Fisheries College during 1986 - 87. The College continued to offer B. F. Sc. and M. F. Sc. degree programmes under the trimester system of education.

Admission

Twenty students were admitted in the first year B. F. Sc programme during the year 1986 - 87. The first trimester for I B. F. Sc. programme commenced on 6.11. 1986.

The number of students on roll in 1986 - 87 was as follows :

Class	No. of students
I B. F. Sc	20
II B. F. Sc	13
III B. F. Sc	17
IV B. F. Sc	17
I M. F. Sc	5
II M. F. Sc	—
Total	72

Educational Tour

The IV B. F. Sc. students were on an All India tour from 14.3.87 to 3.4.87 for studying the various activities of fisheries organisations at Calcutta, Kashmir, Bombay, Goa, Mangalore and Cochin.

The III B. F. Sc students undertook a tour for seven days from 14.3.87 to 21.3.87 to important fishery establishments at Madras, Coimbatore, Ooty, Mettur, Porto Novo and Madurai.

Scholarships

The details of scholarships awarded during the year 1986 - 87 are given below :

Details of scholarship	Amount (Rs.)
Backward Class Scholarship	19,187
Scheduled Caste Scholarship	16,754
Scheduled Caste Loan Scholarship	3,730
National Loan Scholarship	1,940
National Merit Scholarship	1,440
ICAR Jr. Fellowship (P. G)	30,352
Physically Handicapped Students' Scholarship	850
Total	74,253

Students' Hostel

Dr. G. Jegatheesan, Dean i/c was the Warden and Thiru A. Basheer Ahamed, Assistant Professor was the Deputy Warden. There were three students hostels - U. G. hostel, P. G. hostel and Ladies' hostel. Sixty-seven students were residing in the hostels out of which, 46 students were in U. G. hostel four in P. G. hostel and 17 in the Ladies' hostel.

There were two messes functioning in the hostels, one for men and the other for women students. For the entertainment of the students one radio, one sterio-record player and two T. V. sets (one colour and one black and white) were provided in the hostels.

Students' Club

The students' club activities were inaugurated on 23.12.1986 by Shrimathi Meenakshi Rajagopal, I. A. S., Sub-Collector of Tuticorin.

The students' cultural team participated in the Inter-collegiate drama competition conducted by the Lions Club, Tuticorin for Balakrishna Rolling Trophy and bagged the second prize. Th. S. Kalugasalamoorthy of final B. F. Sc and Selvi Margaret of II B. F. Sc were given the award for the best actor and best actress respectively. Thiru S. Kalugasalamoorthy of Final B. F. Sc and Th. P. Md. Sahul Hameed of III B. F. Sc. won the first and third prizes respectively in the essay competition in Tamil conducted on 28.1.87 by the Leo Club and Emarald Service Forum in connection with the Tuticorin Book Fair, 1987. Th. R. Jayaraman of I M. F. Sc. was awarded first prize and Th. Sudharsanam of First B. F. Sc. the third prize in the English Essay Competition conducted by the above forum. The College was awarded with 'Maharaja Rolling Shield' during the occasion for the overall performance.

Elocution contest in English for college students was conducted by YMCA, Tuticorin on 29.1.87 and Th. R. Jayaraman, I M. F. Sc. and Th. Arul Victor Suresh, III B. F. Sc. were jointly awarded with first prize.

FIZZOREE-87, the prestigious quiz competition for the students of all the colleges in the Madurai-Kamaraj University area was conducted at the Fisheries College on 16.2.87.

The National Science Day celebrations were held on 22.2.87. The Rotaract Club of Fisheries College for the year 1986-87 was sponsored by Rotary Club of Tuticorin. Tree planting, children's day celebration and a medical camp at Mudukadu village were organised by this club.

Sports and Games

The Annual Sports Day was conducted on 29.10.1986. Thiru K. Nagappan Nair, Officer in-charge of Central Marine Fisheries Research Institute, Tuticorin presided over the function.

The College volley ball team participated in the Veterinary College, APSYRTUS - 87 at Madras. The cricket, volley ball and badminton teams took active participation in the friendly matches with SPIC, Heavy Water Project, Disco and Kamaraj College at Tuticorin.

POST-GRADUATE EDUCATION

Dr. V. D. Guruswamy Raja continued as Dean (Post-graduate Studies) during 1986-87. Master's degree programme was offered in 23 disciplines and Ph. D in 13 disciplines in Agriculture, Horticulture, Engineering and Fisheries faculties. In Animal Sciences, master's programme was offered in 17 disciplines and Ph. D in 14 disciplines. A diploma course was offered in Sericulture.

During the academic year 1986-87, the following new post-graduate degree courses, viz., M. E. (Ag) in Agro Energy and Power, M. Sc. in Water Management, and Environmental Sciences, and Ph. D. in Agricultural Engineering and Econometrics were started. The Board of Management approved the starting of Ph. D degree programme in Livestock Production and Management from the next academic year.

Admission

Three hundred students were admitted during the year 1986-87 in the various post-graduate programmes offered by the University.

The teachers of this University, as in the past, were permitted to avail themselves the opportunity to acquire higher qualification with pay and allowances under the Internal Deputation policy. During 1986-87 37 teachers were given admission in Ph. D., 24 in Agriculture and 13 in Veterinary, and nine in M. Sc. programme. Similarly 52 Agricultural Officers of the State Department of Agriculture were given admission in the Master's programmes to specialise in their respective fields.

The number of students admitted and passed out in the various degree programmes is given below :

Sl. No. (1)	Post-graduate programme (2)	No. of students admitted (3)	No. of students passed out (4)
I.	**Master's Programme**		
	Coimbatore Campus		
A.	**M. Sc. (Agriculture)**		
1.	Agronomy	20	22
2.	Plant Breeding and Genetics	13	11
3.	Agricultural Entomology	6	3
4.	Soil Science & Agrl. Chemistry	9	6
5.	Agricultural Economics	11	3
6.	Agricultural Extension	16	9
7.	Agricultural Microbiology	7	3

(1)	(2)	(3)	(4)
8.	Seed Technology	14	12
9.	Crop Physiology	5	3
10.	Agricultural Marketing Management	4	4
11.	Plant Protection	5	8
12.	Plant Pathology	2	2
13.	Sugarcane Production	12	17
14.	Farming Systems Management	5	—
B.	**M. Sc. (Horticulture)**	9	7
C.	**M. E. (Agrl. Engineering)**	..	2
	Total	138	112

Madurai Campus

A.	**M. Sc. (Agriculture)**		
1.	Agronomy	11	10
2.	Plant Breeding and Genetics	5	10
3.	Agricultural Entomology	8	5
4.	Soil Science & Agrl. Chemistry	4	3
5.	Agricultural Economics	7	8
6.	Agricultural Extension	8	8
7.	Plant Pathology	6	2
B.	**M. Sc. (Horticulture)**	7	5
C.	**M. Sc. (Food Science and Nutrition)**	3	3
	Total	59	54

Tuticorin Campus

	M. F. Sc.	5	5
	Total	5	5

(1)	(2)	(3)	(4)
Madras Campus			
M. V. Sc.			
1.	Poultry Science	3	—
2.	Therapeutics	2	—
3.	Surgery	4	—
4.	Obstetrics and Gynaecology	2	—
5.	Meat Hygiene and Technology	3	—
6.	Livestock Production and Management	5	—
7.	Veterinary Microbiology	4	—
8.	Pharmacology	4	—
9.	Pathology	2	—
10.	Animal Nutrition	—	2
	Total	29	2
	Grand Total	231	173

II. Doctoral Programme

Coimbatore Campus

A.	**Faculty of Agriculture**		
1.	Agronomy	10	7
2.	Plant Breeding and Genetics	10	5
3.	Agricultural Entomology	6	4
4.	Plant Pathology	2	2
5.	Soil Science & Agrl. Chemistry	4	1
6.	Agricultural Economics	4	2
7.	Agricultural Extension	3	1
8.	Crop Physiology	3	3
9.	Econometrics	3	—
B.	**Faculty of Horticulture**	3	4
C.	**Faculty of Agrl. Engineering**	3	—
	Total	51	29

(1)	(2)	(3)	(4)
Madras Campus			
Faculty of Veterinary and Animal Sciences			
1.	Poultry Science	—	3
2.	Therapeutics	2	—
3.	Obstetrics and Gynaecology	3	—
4.	Meat Hygiene and Techonlogy	2	—
5.	Preventive Medicine	2	—
6.	Veterinary Microbiology	2	1
7.	Animal Nutrition	1	—
8.	Dairy Science	2	2
9.	Animal Genetics and Breeding	2	4
10.	Pharmacology	2	2
	Total	18	12
	Grand Total	69	41
	Total - All P. G. Programmes	300	214

UNIVERSITY LIBRARY

The Tamil Nadu Agricultural University has a well equipped library holding a unique collection of scientific documents in the fields of agriculture, horticulture, forestry, fisheries, agricultural engineering and other allied subjects, housed in a modern building with all the latest amenities. The library is open to all students and faculties of the University from 9 A. M. to 9 P.M. on Monday-Friday and 8 A. M. to 2 P.M. on Saturday and Sunday, excluding public holidays.

In addition to building up of reference and research collections of printed materials, the library supports specialized curricular and research needs with substantial microform holdings, reprints, pamphlets, leaflets, reports and maps. Apart from the reference services the library offers classes on library resources, bibliographic instructions and documentation services. The staff of the acquisition section renders necessary assistance to the students and faculties for book purchase and journal subscriptions. The faculties as well as students are kept informed of recent acquisitions through the "Recent Addition" section. The library maintains current and back volumes of periodicals as well as reserved books and articles. Besides its own collection, the inter-library loan facility is available to obtain materials from other universities, colleges and academic institutions all over the country.

During the year 1986-87 the library accessioned 2,239 books and back volumes of journals. It received 500 books as gratis and had 1,30,023 books and back files of periodicals in its stack. The library received 1,011 periodicals of which 849 were being subscribed. Out of these periodicals 535 were foreign journals and rest were Indian journals. Thirty journals were received on exchange basis for Madras Agricultural Journal. During the year the library received 132 journals as gratis.

The library received 8,251 issues of periodicals and they were displayed for the use of the readers in the current periodicals display racks. Back volumes of periodicals numbering 1,479 were bound and added to the stock.

During this year 1,250 documents were classified, catalogued and arranged in the library. Shelf Register Cards, Subject Cards, Author Cards, Book Cards and Tracing Cards were prepared for the easy reference and charging work.

The library arranged inter-library loan facilities from the libraries of other institutions in India and abroad on reciprocal basis.

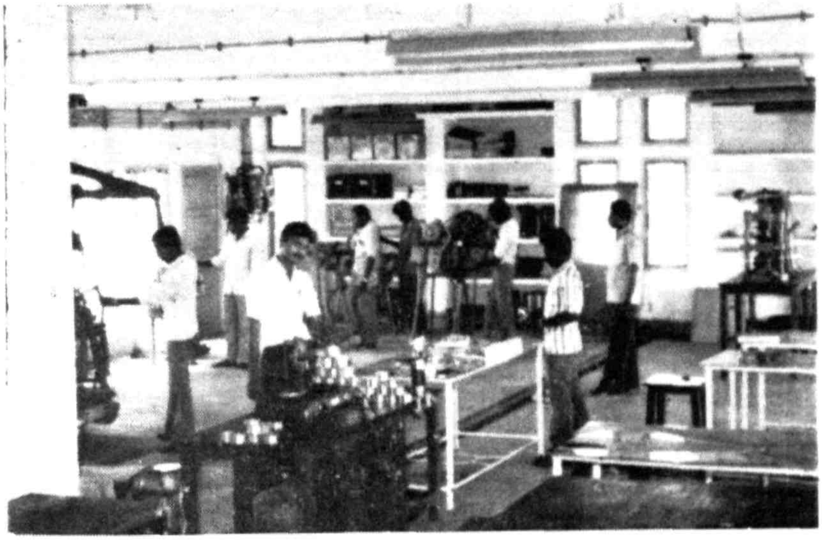
Research stations of the University were supplied with xerox copies of important research articles published in the leading scientific journals through Director of Research (Agri).

The library was visited by 70,550 readers. They consulted 6,72,081 books and periodicals and took 50,035 books on loan for home reading.

Twenty-eight classes on library management and effective use of library were conducted for the undergraduate, Post-graduate and Ph. D. students. They had been informed about various types of libraries, different types of journals and the national and international information retrival sources. The importance of the micro documents, the service of the current awareness list, the service of the current content etc. were also being taught for obtaining international documentation services.

To computerise the library functioning, 48, 499 subject cards were prepared and fed into the computer. A modified note on library and information system was also prepared.

The Library Committee of the University met four times during 1986-87 and discussed about the further development of library and its services under the Chairmanship of Dr. K. R. Ramaswamy, Dean (Agri)



B.F.Sc Students at Canning Plant

B. Sc (Ag) Students at Plot Cultivation

Sports Day - Agricultural College, Madurai

Republic Day Sports : Staff vs Students Basket Ball Match

'eterinary Festival at Madras Veterinary College, Madras - Indian Airlines' Area Manager Awarding Prizes to Winners

Interclass Competition of Arts at Madras Veterinary College, Madras

Laboratory cum Administrative Block, TRRI, Aduthurai

4. RESEARCH

The major research achievements of the University in the areas of improvement, management and protection of crops, seed technology, horticulture, agricultural engineering, water technology, agricultural and rural development studies, veterinary and animal sciences and fishery science are presented in this chapter.

AGRICULTURE

RICE

Crop Improvement

Varieties released

TPS 2 (Thirupathisaram 2) : This is a hybrid derivative of the cross IR26/CO40 with grain and straw yield improvement of 22.5 and 34.0 per cent respectively over IR 20. With a crop duration of 125-130 days, it is found to suit well for the *pishanam* season of Kanyakumari district. The variety also possesses moderate resistance to pests and diseases. In view of white-bold grain, the variety has good consumer acceptance. The average yield of this variety is 4.3 t of grain and 8.2 t of straw per hectare.

ADT 37 : This variety is semi-dwarf in stature (95 cm) and has a duration of 100-105 days. It is capable of giving 6.3 t/ha. This has combined resistance to leaf yellowing, blast, brown spot, BPH and GLH. It is also moderately resistant to BLB, RTV, gallmidge and leaf folder. The grains are round and bold with a high milling recovery of 71%. It is suitable for *kar, kuruvai* and *sornavari* seasons as an alternative variety to TKM9, IR 50 and ADT 36.

ADT 38 : This was released for *samba / thaladi* cultivation. It is dwarf in stature (80-85 cm) with a duration of 140-135 days. It is a heavy tillering type with medium slender fine grain. Its cooking quality is very good. It possesses resistance to blast, brown spot, GLH and WBPH. It is also modetately resistant to RTV, BPH, leaf folder and gallmidge. It is capable of giving 6.0 t/ha. It is an alternative variety to CO 43, CO 44 and IR 20.

Hybrid rice cultures

IR 547524 / IR 14753 - 120 - 3, IR 547524/IR 19392-211-1 : Among eight TRRI hybrid on comparison with CO 43 during *Kharif* season, the above hybrid recorded standard heterosis of 10.65 per cent. It gave a yield of 7056 kg/ha against 6377 kg/ha obtained in CO 43. The enhanced yield was contributed by profuse tillering (9.7 no.), panicle length (26.3 cm) and number of grains per panicle (133 no.).

Cross combinations of ZS 97 A/IR 50, ZA 97A/IR 36 and IR 46828 A/IR 50 : These showed 21.03, 12.63 and

11.00 per cent standard heterosis for grain yield over IR 50 from among 50 hybrids evaluated.

Anther culture studies in rice

The callus inducing medium containing sucrose (3%), 2-4-D (1.5 mg/l) and coconut water (5%) was used as callus for regeneration of plantlets and anther calli were transferred to (BAP) 1 mg/l case in hydrolysate and coconut water (5%). Dwarf variants of Ponni were isolated for further evaluation in the field. The individual anther derived lines possessed distinct character combinations derived from both the parents and were highly stable. It was observed that lines ACO and AC 2 gave good yields of 5.8 and 5.5 t/ha respectively, representing an increase of 9.4 and 3.8 per cent over IR 50 lines AC 3, 4 and 8 and showed resistance to BPH.

Crop Management

The relative merits of a stem nodulating new green manure, *Sesbania rostrata* in terms of nodulation, N addition and biomass production were evaluated by a comparative study with other commonly employed green manure crops. Within 60 days of growth period, *Sesbania rostrata* could produce 30 t/ha of green matter with relatively high N content of 3.92 per cent in root and 4.16 per cent in shoot and accounted for a contribution of 155 kg N/ha against 123 kg/ha, in *S. aculeata* and 96 kg/ha in *C. juncea*. Studies also revealed that for seed production summer season was ideal. The topping of plants at flower initiation stage induced more branching, more number of pods and formation of bold seeds. Winter season and sodic soil were found to restrict the growth and nodulation.

The yield and cost-benefit ratio in respect of three crop sequences were evaluated at Bhavanisagar. Highest net return (Rs. 21250/ha) and cost-benefit ratio (2.7) were obtained in the crop sequence rice - groundnut - blackgram when compared with rice-groundnut-cotton (Rs. 15000/ha and 2.5) and rice-groundnut-gingelly (Rs. 16700/ha and 2.4).

The relative efficacy of various methods of *Azospirillum* fertilisation such as seed treatment, seedling treatment and application to main field and seedling dip showed that *Azospirillum* treatment in both seed and seedling in addition to soil application brought about 47 per cent improvement in grain and straw yields. This treatment gave grain and straw yields of 6.5 and 9.3 t/ha as compared to 4.4 and 6.3 t/ha in control.

BGA plus other biofertiliser interaction studies indicated the BGA+*Azospirillum* combination proved highly compatible and accounted for the highest grain yield of 5.6 t/ha representing 15.3 per cent improvement over 100 kg N/ha alone (4.9 t/ha).

Application of fresh neem leaf at 5 t/ha 10 days prior to transplanting along with 60 kg N/ha as prilled urea resulted in good N recovery, high response ratio and maximum grain yield.

Among different modified forms of urea, USG and SCU performed well during *samba* and N response, was noticed upto 112.5 kg/ha.

For rice, soil application of $ZnSO_4$ was found to be the best method.

Rice - ADT 37

Rice - TPS 2

The study on the pysiolological effects of *Kuruvai* crop residue on the growth of subsequent *thaladi* rice (IR 20) revealed that application of urea at 25 kg N/ha and lime at 500 kg/ha at the time of incorporation of stubbles increased the grain yield by 18.5 per cent and 16.3 per cent respectively over control.

In single crop wetlands of old delta of Thanjavur district, growing chillies after *samba* paddy registered the highest net return of Rs. 18,800/ha.

Mixing butachlor with sand, soil, coconut coir waste, ash, neem cake or neem cake coated urea was found to be as effective as direct spraying in controlling weeds.

Varietal screening for tolerance to salinity and sodicity at Aduthurai revealed that varieties SSRC 213 and SSRC 215 were relatively more tolerant to sea water intrusion compared to other varieties.

At SSRC. Trichy, it was found that application of 75 kg magnesium sulphate with 50 per cent GR and *Vadanarayana* leaves at 5 t/ha increased the grain yield in sodic soil.

Crop Protection

The efficacy of combined application of plant protection chemicals and zinc sulphate was investigated. Monocrotophos (or phosalone), edifenphos (or mancozeb) and zinc sulphpte could be combined for effective plant protection and nutritional effects.

At Tirur, compatability of monocrotophos with three commonly used fungicides, viz., edifenphos, moncozeb and carbendazim was tested in CO 43 during *samba* season and monocrotophos was found compatible with all the three fungicides.

The relative merits of nine different currently recommended insecticide for the control of leaf folder were evaluated at Tirur during *samba* 85 - 86 and 86 - 87 seasons with CO 43 as test crop. Spraying of monocrotophos 36 WSC at 500 ml/ha proved most effective for the leaf folder control and ensured high yield and returns.

Among four non - edible oils, viz., neem, *eluppai*, *maravetty* and *pinnai*, neem oil and *eluppai* oil were found to suppress BPH feeding effectively.

Studies were made on the resurgence of BPH as a consequence of insecticidal usage. Among the mechanism of resurgence, re-productive stimulation in females receiving sub-lethal doses and selective removal of natural enemies were of major relevance. The resurgence inducing insecticides created a conducive environment for the BPH to orient, feed and reproduce, leading to a high population build up. The studies stressed the need for forewarning farmers on the undesirable effects of indiscriminate use of pesticides.

Studies on the relative losses resulting due to occurrence of pests and diseases in rice were carried out with test crops of IR 50 and CO 43. Stem borer, leaf folder, brown spot and sheath rot constituted the key pests and diseases of rice. In unprotected case these two varieties registered grain yields of 3923 and 4227 kg/ha respectively, representing a loss of 16.26 and 10.42 per cent. By protecting against disease alone, the varieties yielded 4301 and 4395 kg/ha amounting

to 8.18 and 6.87 per cent losses respectively. Controlling both the pests and diseases improved the yield to 4685 kg/ha in IR 50 and 4720 kg/ha in CO 43 representing only 3.74 and 3.26 per cent losses respectively. Thus, protecting the crop against both pests and diseases resulted in an economic gain of Rs. 996/ha in IR 50 and Rs. 562/ha in CO 43.

The insecticidal effect of eleven different formulations on predatory bug *C. lividipennis* (BPH nymph predator) revealed the highly toxic nature of pyrethroids and the least toxic nature of endosulfan (0.07%).

The effect of insecticids on the incidence of gallmidge and the parasite *Platygaster* spp. was studied. Twenty days after the treatment it was found that the incidence of gallmidge was the lowest in carbofuran 3 G followed by chlorpyriphos 40 EC at 0.5 kg a.i./ha.

Experiments conducted at Coimbatore in *samba / kar* seasons indicated that leaf folder incidence was minimum when N was applied as urea super granules. Next in preference were urea and coal-tar coated urea. Neem cake coated urea was associated with relatively severe incidence.

The efficacy of carbendazim, thiram and pyroquilon was studied at Aduthurai and Coimbatore. Seed treatment with carbandazim or pyroquilon (at 2 g / kg) showed good control of the disease. The seed treatment procedure involved soaking of treated seeds in water for 24 hours (at 1 litre/kg) and subsequently draining away the water and allowing the seeds to sprout.

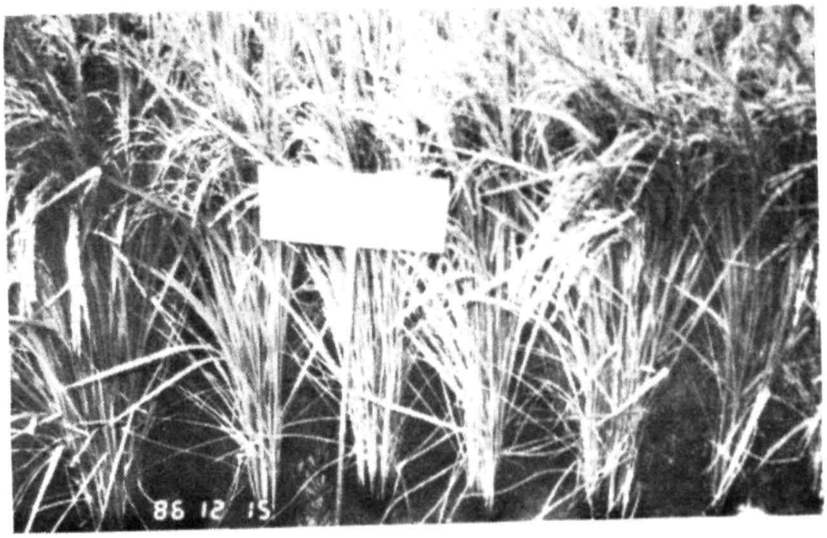
Nine different planting dates were taken up and nature and intensity of brown spot and sheath rot were investigated with rice varieties CO 43, IR 20 and TM 8300 as test crops during *samba* seasons of 85-86 and 86-87. The studies revealed that optimum time of planting for *samba* in Chinglepet district was 10th to 30th September. In hot spot areas for brown spot, sheath rot and grain discolouration, late planting (in October) should be avoided.

The occurrence of brown spot disease in relation to soil and foliar application of different micronutrients during second crop season with IR 20 as test crop was studied at Madurai. Soil cum foliar application of either copper sulphate or ferrous sulphate reduced the occurrence of leaf spot and enhanced the grain yield.

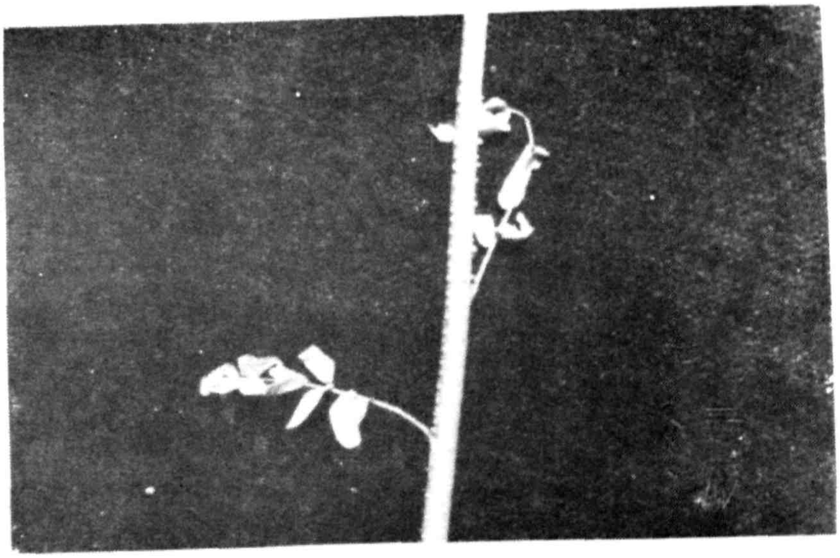
Spraying of carbendazium (250g/ha) or moncozeb (1kg/ha) at grade 1 was found to be effective in minimising the sheath rot occurrence at Madurai.

Nine different fungicides, viz., thiophenate methyl, edifenphos, pyroquilon isoprothiolane, kasugamycin, IBP, propiconazole, mancozeb and carbendazim were evaluated for their relative merits in the control of brown spot disease at Aduthurai employing IR 20 as test crop. The fungicides were sprayed thrice (at tillering, panicle initiation and flowering stages) and the disease intensity was assessed ten days before harvest. Thiophenate methyl and edifenphos ranked best in the control of the disease and giving good grain yield.

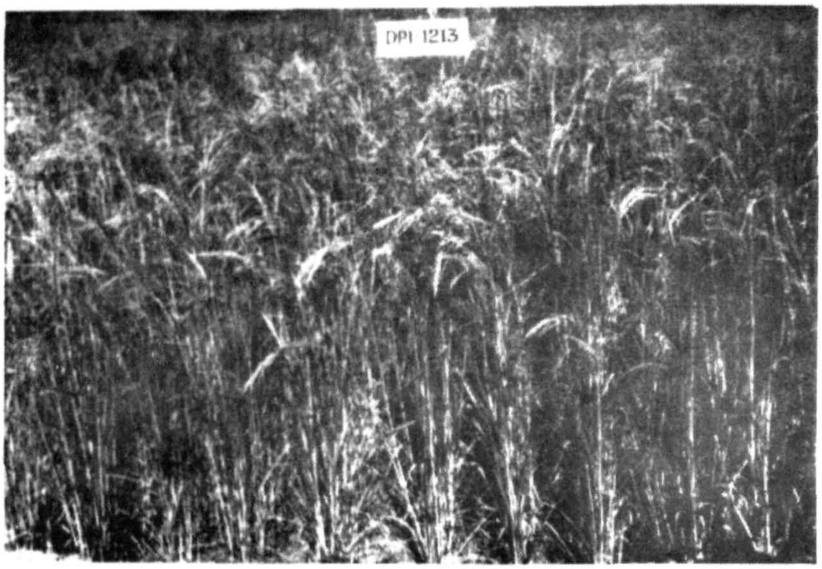
The reaction of 99 MLT cultures, 45 cultures of cross derivatives and 20



Rice - ADT 38



Sesbania rostrata - a Stem Nodulating Green Manure Crop



Samai - Paiyur 1

Blackgram - ADT 4

hybrid rice parents to RTV was evaluated. Six cultures under MLT (TNAU 80042, TNAU 8005, TNAU 801793, TNAU 831520, TNAU 831521 and AD 85002), five cultures among derivatives (TNAU 842805, TNAU 842806, TNAU 85404, TNAU 831145 and TNAU 840198) and one hybrid rice parent (Pankhari 203) were found to be resistant to RTV.

MILLETS

SORGHUM

Crop Management

Studies on intercropping of sorghum with pulse crops under irrigated condition revealed that intercropping of sorghum with cowpea (CO 1) was the best with a net return of Rs. 4,900/ha.

Comparative evaluation of varied proportions of sorghum and blackgram as intercrops under rainfed condition at Kovilpatti revealed that the combination of 100 per cent sorghum plus 33.3 per cent blackgram was ideal in terms of productivity and net returns.

The interaction effect of four different methods of land shaping and three levels of irrigation was studied in blackgram intercropped in sorghum for two years. The bed - furrow system under 0.6 IW/CPE level of irrigation ranked best in both years ensuring highest grain yield and water use efficiency (10.44 kg/mm/ha).

Crop Protection

Correlation studies relating shootfly eggs and plants with dead heart symptoms gave evidence for the existence of significant positive correlation between the two. The regression analysis revealed that for every unit increase of egg per plant, there was an increase in dead heart by 1.00 per cent in CSH 9 and CO 26. The earlier recommendation of ETL of 10 per cent dead heart for sorghum shootfly can be modified as ETL of one egg per plant in 10 per cent of plant population in the first two weeks.

Seed treatments with monocrotophos, chlorpyriphos or DDT was found to control weevil incidence. The combined application of chlorpyriphos and DDT with any one of the three fungicides, *viz.*, thiram, captan and carbendazim proved more efficient than individual application.

Studies on pesticide residues in grain revealed that sorghum treated with malathion (0.05 per cent) for the control of earhead bug had not resulted in toxic accumulation of the pesticide. The grain samples recorded 0.265 to 1.427 ppm which was well below the tolerance level of 4 ppm.

Scymnus gracilis, a coccinellid beetle in adult and larval stages was found to be a potential predator of mite *Obligonyohus indicus* at Coimbatore. Consumption rate was of the order of 40 to 70 eggs per day by grub and 40 to 50 nymphs and adults by adult beetle.

Studies undertaken during 1985-86 to relate the earhead bug incidence with weather factors showed that minimum temperature was positively related to population during flowering and grain hardening stages; maximum temperature was negatively related at maturity stage; relative humidity was negatively

related during flowering and positively related during maturity; and rainfall was negatively related at flowering, grain hardening and maturity stages.

The efficacy of different fungicides (alone and in combination) on the control of sugary disease was evaluated. Carbendazim (0.1%) plus tridemorph (0.1%), carbendazim (0.1%) plus TMTD (0.2%) and thiophanate methyl (0.2%) were found to be very effective against sugary disease.

The effect of various bio-agents on disease control revealed that seed treatment with *Glomus sp* significantly reduced the downy mildew.

CUMBU

Crop Improvement

Hybrid cumbu : Investigations on genetic factors associated with rust resistance in cumbu by effecting crosses in five parents resulted in identification of the hybrid culture (PT 3822xICMPES 11, PT 3832 x 732 B) as a source material for exploiting rust resistance.

Crop Management

In the test crop of CO 7, combined application of both *Azospirillum* and VA Mycorrhizae fungi along with 20 kg P_2O_5/ha accounted for the highest grain yield of 3148 kg/ha.

Crop Protection

Epidemiological studies revealed a significant negative correlation between maxium temperature and disease incidence, and positive correlation between rainfall / evening relative humidity and disease incidence.

RAGI

Crop Improvement

Variety Released

TRY 1 : This was developed specially to suit salt affected soils under conditions of high soil pH (8.5 to 10.0 and EC 0.41 m. mhos/cm). This variety has rccorded a grain yield of 4676 kg/ha representing 24 per cent enhanced yield over CO 12. It matures in 100 days and the grain quality is good.

Crop Management

Studies on the effect of continuous application of fertilisers alone and in combination with FYM in inceptisol at Coimbatore over a period of 15 years indicated that the highest yield was associated with application of NPK at 100 per cent recommended level along with 10 t/ha of FYM each year. This treatment registered the highest net return of Rs. 2359/ha.

Crop Protection

Spraying of IBP thrice (at tillering, earhead emergence and 10 days after earhead emergence) to control blast accounted for least neck and finger infection in ragi.

MAIZE

Crop Management

The bed-furrow method of land shaping recorded the highest grain yield (3825 kg/ha). Among irrigation levels 0.6 IW/CPE ratio was associated with high yield (3845 kg/ha). However, water use efficiency was highest at 0.4 IW/CPE ratio though the yield was only 3300 kg/ha.

The effect of continuous application of fertilisers in maize with and without FYM was investigated under permanent manurial experiments at Coimbatore. The results showed that application of NPK (100 per cent recommended level) along with FYM 10 t/ha (once a year) registered the highest economic return of Rs. 3298/ha.

A method of composting of coir pith by inoculation with *Pleurotus* sp was developed. The inoculant at the rate of five bottles of mother spawn with five kg of urea per tonne of coir pith was mixed thoroughly and kept in the yard as per heap method of composting. After a period of 26 days there was a remarkable change in the colour of the coir pith which turned from brown to black with distinct change in volume indicating the decomposition of coir pith by *Pleurotus* sp. The decomposed coir pith had lesser lignin (4.8%) and cellulose (10.1%) and higher nutrient contents of N (1.1%), P (0.05%), K (1.2%), Ca (0.50%), Mg (0.5%), Fe (0.09%), Mn (20.0 ppm), Zn (15.8 ppm) and Cu (6.2 ppm) than raw compost. The C:N ratio narrowed down to 24 : 1 which was comparable to farm yard manure and compost.

Continuous cropping and fertilization witn ragi - cowpea - maize crop sequence over a period of years had resulted in the build up of total nitrogen, organic carbon and available nitrogen content of the soil compared to the initial status at the start of the experiment in 1972. The total N content increased from 0.042 per cent to 0 065 per cent and organic carbon content from 0.30% to 0.53%. Addition of FYM along with 100 per cent NPK had resulted in the highest build up of nutrients in the soil. The physical properties of soil, viz., bulk density, hydraulic conductivity and porosity were unaffected due to continuous cropping and fertilization.

SAMAI

Crop Improvement

Varieties Released

Paiyur 1 : This is a selection from Sathur local. It has a yield potential of 870 kg of grain and 1600 kg of straw/ha, representing 20 per cent increased grain yield compared to CO 2. It is found to be non-lodging, drought resistant and highly responsive to fertilizer. It matures in 100 days.

PANIVARAGU

Crop Improvement

Variety Released

CO 4 : This variety was released after seven years of study in Tamil Nadu and four years in various other parts of the country. This has given a mean yield of 1400 kg of grain and 4800 kg of straw per hectare. However, the yield potential is of the order of 3670 kg/ha. The variety matures in 75 days and possesses attractive yellow coloured grains.

TENAI

Crop Improvement

Variety Released

K 3 : It has recorded an average yield of 1621 kg/ha in a duration of 82 days. It is non-lodging and tolerant to drought.

PULSES

Crop Improvement

Varieties Released

Blackgram - Vamban 1 : This is a hybrid derivative (KM 1 x H 76-1) with a yield potential of 1600 kg/ha. This is highly resistant to yellow mosaic. The crop duration is 60-65 days.

Blackgram - ADT 4 : This is a hybrid cross derivative (T9/ADT2/Pant U 14) with a yield potential of 1000 kg ha in a duration of 70 days. The yield is higher by 14 per cent over ADT 3. It possesses tolerance to yellow mosaic and is suited for rice fallows of Cauvery delta.

Crop Management

BLACKGRAM

Evaluation of rhizobial cultures revealed that culture BMBS - P4 was efficient for blackgram.

Blackgram varieties KB 1 and NPRB 1 were found to be suitable intercrops for cotton (LRA 5166 and MCU 10), registering high cost-benefit ratios of 5.35 and 4.74 respectively.

SOYBEAN

Optimum NPK for rainfed soybean at Paiyur was found to be 20:30:20 kg/ha with a cost-benefit ratio of 3.01.

Sulphur application at 30 kg/ha in the form of superphosphate enhanced the soybean yield to 888 kg/ha in red soil.

Inoculation of *R. japonicum* 61A76 and G3 enhanced nodulation and yield in soybean. The yield was improved by 54.3 per cent in the latter strain over control

Crop Protection

REDGRAM

NPRR 2 culture, registering a yield of 1372 kg/ha, showed resistance to sterility mosaic.

Release of the pod borer parasite, *Eucelatoris bryani* at fortnightly intervals followed by two NPV sprays controlled the redgram pod borer effectively.

BLACKGRAM

Application of carbofuran or phorate (1 kg ai/ha) at sowing or spraying of any one of phosalone (2.5 l/ha), phosphamidan (0.5 l/ha) and quinalphos (1 l/ha) at 10th and 25th DAS resulted in reduced whitefly incidence and leaf crinkling disease in blackgram.

GREENGRAM

Studies on seed dressing in greengram with fungicides, insecticides, rhizobium, superphosphate and potassium dihydrogen phosphate and their combinations indicated that application of carbendazim (28 g/ha) plus monocrotophos (5 ml/kg) plus rhizobium was ideal for effective control of root rot.

SOYBEAN

Chemical control studies for the control of leaf miner, *Aproerema modicella* indicated that application of quinalphos (1.5% D on 25th DAS and 40th DAS ensured control of leaf miner.

Various organic amendments were compared with chemicals in the control of root rot in soybean. Neem cake and neem leaves caused maximum reduction in the incidence (9.0 per cent and 14.4 per cent as against 83.0 per cent in the control).

OILSEEDS

GROUNDNUT

Crop Improvement

Variety Released

ALR 1 : This has a yield potential of 1840 kg/ha as compared to 1462 kg/ha in JL 24, 1322 kg/ha in POL 2, 1490 kg/ha in CO 2 and 1341 kg/ha in TMV 2. With a crop duration of 120 days it possesses resistance to rust and late leaf spot. The shelling percentage is 70 and the oil content is 50.34 per cent. The variety is found to be specially suited to the rainfed tract of Pollachi.

Crop Management

Studies carried out for the integrated management of *Cyperus rotundus* indicated that deep ploughing thrice at fortnightly intervals and allowing the bulbs to dry off followed by hand-weeding twice ensured weed control to the level of 78.9 per cent. However, use of weedicide (glyphosate at 1 kg a.i/ha applied twice on 15 and 35 DAS) also resulted in equally effective control.

The effect of application of inorganic amendments like gypsum and organic amendments like FYM, coir dust and groundnut shell in overcoming the problem of surface crusting in red soil was studied. Basal incorporation of coir dust (5 t/ha) one fortnight prior to sowing helped to overcome the crusting problem and improved the groundnut yield by 24 and 19 per cent respectively under rainfed and irrigated conditions. Apart from the physical improvement of soil, availability of P_2O_5 and K_2O was also enhanced.

At Tindivanam, the effect of application of combined spray of DAP (0.5%) + planofix (40 ppm) + ammonium sulphate (0.2%) + boric acid (0.1%) during stray flowering and peak flowering stages was studied. This treatment registered 18 per cent yield improvement, reduced the flowering duration by 8-11 days and ensured high reproductive efficiency (62.7%) and pod setting (42.1%)

Crop Protection

The threshold studies conducted at Vridhachalam on leaf miner, *Aproaerema modicella* of groundnut indicated a loss of 6.58 kg/ha for every larva/m².

The effect of various combinations of intercropping on leaf miner indidence was studied at Vridhachlam in relation to degree of parasitisation by *Goniozus sp.* Less incidence occurred in groundnut - cumbu (4 : 1) intercrop system with the maximum economic return of Rs. 8246/ha

At Paiyur, studies on pest dynamics in dryland cropping (intercropping of lablab in groundnut) over two year period showed that the population of leaf hopper and leaf miner was reduced in the groundnut - lablab intercropping system.

Laboratory studies to find out the compatability of *Spodoptera litura* nuclear polyhedrosis virus with fungicides revealed that the efficacy of virus was not affected by copper oxychloride or carbendazim or mancozeb.

Application of monocrotophos (0.05%), phosalone (0.05%), chlorpyriphos (0.05%), quinalphos (0.0337%) and HCN (2.5 kg ai/ha) thrice at 30, 70 and 95 DAS left no toxic residues in kernels and haulms. A safe waiting period of 20 days was suggested.

The efficacy of different chemicals on groundnut pests was evaluated at Salem. All the chemicals which included diflubenzuron, 25 WP (1.2 kg/ha), chlorpyriphos 20 EC (2 l/ha), endosulfan (750 ml/ha), and phosalone 35 EC (750 ml/ha) proved useful in the control of pests.

SESAMUM

Crop Management

Studies on possibility of having intercrops of greengram and cumbu were taken up with different sowing ratios. Results indicated that a pure crop of sesamum was highly profitable (net returns Rs. 3216/ha) with a yield of 536 kg/ha. Intercropping of cumbu in 6:2 ratio ranked next best with a yield of 352 kg/ha of sesamum and 318 kg/ha of cumbu.

The beneficial effects of growing gingelly by transplanting instead of seeding were investigated at Coimbatore in clayloam soil. Transplanting of 14 - day old seedlings either from pai nursery (1299 kg/ha) or from raised bed nursery (1246 kg/ha) proved advantageous over direct seeding (1084 kg/ha).

Screening studies for resistance to cyst nematode *Heterodera cajani* revealed the moderately resistant nature of the following cultures :

Si 2138, Si 1167, Si 918, Si 1765, Si 1907, Si 2642, Si 1250, Si 71, Si 2215, Si 889, Si 1137 and Si 1601.

COCONUT

Crop Improvement

East Coast Tall x Malaysian Dwarf yellow hybrid : This was developed at Veppankulam. The annual yield observed was 97 nuts/tree as compared to 91 nuts/tree in VHC 1 and 61 nuts/tree in ECT. The hybrid was associated with a copra content of 159 g (on par with VHC 1 but higher than ECT) and oil percentage of 72.4 (as against 70.2 in VHC 1 and 64.3 in ECT). The hybrid had low degree of buckling of bunches and greater resistance to leaf spot.

Tall x Dwarf hybrid : At Coimbatore over 7½ year period, this hybrid recorded a cumulative yield of 474 nuts/tree as against 395 nuts in D X T and 239 in Tall.

Tissue culture

Embryo culture studies were initiated at Coimbatore and successful callus formation was obtained from tender leaf cabbage of adult trees in ms medium supplemented by Kinetin (1 mg/lit).

Crop Protection

Investigation for the control of coccid through insecticides indicated that single spray of dimethoate (0.03%) or monocrotophos (0.04%) or methemyl

(0.02%) was effective in reducing coccid population.

Control of black headed caterpillar

Root feeding of monocrotophos (ten ml in ten ml of water) through the cut surface of a live root (24 hours absorption time) enabled the complete control of black headed caterpillar within 30 days of treatment.

MUSTARD

Crop Improvement

Varietal Evaluation

The relative yield potential of ten varieties were evaluated at four locations (Tindivanam, Paiyur, Coimbatore and Yercaud). Among these B 85 (Seetha) ranked best with a yield of 503 kg/ha. Varieties B 54 and PY 303 with a yield potential of 370 kg/ha ranked next best. The duration of these cultures was 70-72 days.

COTTON

Crop Improvement

Physiology of intra - specific hybrid

The physiological basis of heterosis of the cross hybrid LRA 5166 X MCU 10 was investigated. The hybrid registered 41 per cent more seed cotton per plant and 30 per cent more lint yield, compared to the better parent. The major physiological parameter was leaf area index (LAI) contributed by more number of leaves. The DMP in the hybrid was higher by 52 per cent, attributable to the negative heterosis of photo-respiration (6.44 per cent). The hybrid was also associated with high nitrate reduction activity and stomatal frequency of the abaxial surface. All these led to the dsirable performance of the hybrid.

Genotypes for moisture stress

The cultures LH 372, 5172, TKH 495, Hybrid 8309, DPI 31/82, TKH 44 and SVPR 763 were assessed as superior ones among 50 genotypes evaluated for moisture stress conditions at Srivilliputhur as indicated by relative water content, stomatal number and seed yield.

Crop Management

In sandy loam soil, basal dose of 40:40:20 NPK/ha followed by top dressing of 20 kg N each at 45 and 60 DAS, and foliar fertilisation of K at 10 kg/ha each at 45th and 60th DAS accounted for additional yield of 3.05 q/ha over the recommended level of 80:40:40 NPK/ha with N in two equal splits.

During winter season, delaying the application of P and K in full and 25% N to 25th DAS and top dressing of remaining N in two splits (50% at 45 DAS and 25% at 60 DAS) increased the yield by one quintal per ha over the recommended time of NPK application. This practice is suitable in areas where the practice of dibbling cotton in ragi stubbles is in vogue.

Butachlor (one kg/ha) proved to be an effective herbicide for dicot weeds during summer. It suited to cotton-blackgram intercropping system as well.

Pre-emergence application of thiobencarb (1.5 kg/ha) supplemented by one hand weeding reduced weeds and enhanced cotton yields.

Irrigation x varieties interaction studies at Srivilliputhur indicated the sufficiency of irrigating SVPR 763 at 25% ASM upto 80 days and at 50% ASM thereafter to get high seed cotton yield.

Azospirillum inoculation combined with 75% recommended N in cotton intercropped with onion recorded 1287kg/ha of kapas yield as compared to 1256 kg/ha in 100% N alone, registering a saving of 25% N with 2.5% enhanced yield.

Crop Protection

Evaluation of synthetic pyrethroids, organophosphorus and organochlor formulations for the control of bollworm (need based application at ETL of 10%) in MCU 9 revealed that all chemicals controlled the incidence. Fenvalerate 20 EC (75 g/ha) registered the lowest incidence on locule basis followed by endosulfan.

Application of neem cake (1.25 t/ha) plus FYM (5 t/ha) followed by soil inoculation of *Trichoderma viride* brought about 90 per cent germination with minimum post - emergence mortality.

Pelleting of seeds with *T. harzianum* and *T. viride* reduced the post - emergence mortality from 75.2 to 13.0 and 18.8 per cent respectively.

Greengram as intercrop in cotton resulted in reduction of leaf hopper. With sunflower and coriander aphid incidence was minimum in cotton.

Soaking of cotton seeds in a solution of methyl demeton (5 ml)+carbendazim (22 ml) or dimethoate (5 ml) reduced early season sucking pests and seedling diseases.

Crop sown during first week of September suffered less weevil attack (8.12%) as compared to earlier sowings during August (31% to 68%).

Spray applications with ULV hand sprayer, HV sprayer and LV sprayer for EC formulations were compared. ULV spraying involved minimum labour (Rs. 2.50/ha) as against low and high volume sprayings (Rs. 25.00 / ha and Rs. 62.50/ha respectively). While ULV spraying could cover 4.00 ha per day, low volume and HV sprayings covered only 1.00 ha/day and 0.40 ha/day respectively.

SUGARCANE

Crop Improvement

Variety Released

COC 86062 : It has registered 119.5 t/ha of cane yield with 14.7 per cent CCS as against 96.5 t/ha of cane yield with a CCS of 13.3% in COC 671. It is suited for early season (Dec-Jan) planting.

Crop Management

At Cuddalore, COC 671 suited well for planting during January to March while COC 85061 showed yield decline when planted beyond February.

At Sirugamani, planting in April was found to be the best for all varieties.

Application of 225 kg N/ha plus *Azospirillum* 9 kg/ha registered a cane yield of 144.5 t/ha.

Application of N and K in three splits on 30, 60 and 90 DAP improved growth and enhanced cane yield (108 t/ha) under early drought condition. Sett treatment with ethrel (200 ppm)

or urea and potash spray (2.5 per cent) on 120-130 DAP proved beneficial by registering a yield of 113 t/ha as against 101 t/ha in the control.

For Gudiyatham area a seed rate of 1.11 lakh setts/ha (single budded) at 15 cm intra-row spacing in paired row system of 40 × 40 + 80 cm apart, combined with N application of 225 kg/ha proved best for COC 671 by registering 115 t/ha of cane and 16 t/ha of sugar.

Application of zinc sulphate (37.5 kg/ha) along with press mud (5 t/ha) or combined addition of zinc sulphate (37.5 kg/ha) and ferrous sulphate (100 kg/ha) resulted in significant improvements in the yields of cane and sugar in Sirugamani sugarcane belt.

FORAGE CROPS

Crop Improvement

Promising cultures

Cereal Fodders

K 7 fodder sorghum culture recorded a green fodder yield of 25.61 t/ha in 51 days under rainfed condition in Aruppukottai and Erode.

African tall fodder maize culture recorded an average yield of 23.25 t/ha, representing 11.13 per cent improvement over CO 1.

TNSC 1 fodder cumbu culture recorded a mean yield of 26.69 t/ha representing an increase of 2.80 per cent over giant bajra and 50.70 per cent over local.

Grasses

Forage grass cultures, viz., Giant Napier and NB recorded yields of 226 and 235 t/ha accounting for 12 per cent and 8 per cent enhanced green fodder yield over CO. 1.

Crop Management

At Vellore BN 2 + Desmanthus in the ratio of 2 : 1 ranked best, recording 432 t/ha.

Maize + cowpea in the ratio of 1:1 ranked best for summer and cold weather conditions at Vellore.

Maize (African tall) + cowpea at 2:1 ratio registered 24.4 t/ha of green fodder, 6.47 t/ha of dry matter and 617 kg/ha of crude protein as against 22.6 /ha of green fodder in pure maize crop at Aruppukottai.

At Paiyur, cumbu + cowpea in 2:1 and 1:1 (32 t/ha and 36 t/ha respectively) was found better than other combinations like sorghum, maize or ragi with legumes.

MUSHROOM

New Strain Released

Oyster Mushroom CO 1 : It is a high yielding type with 13% increased yield over *Pleurotus sajor caju*. It produces white mushrooms, hence has good consumer appeal. The yield is 414 g per bed of 500 g of paddy straw with high protein content of 27%.

SEED TECHNOLOGY

RICE

Evaluation of paddy seed samples (IR 20, Ponni, CO 43) for freeness from diseases revealed that the abnormality occurred in seedlings to the extent of seven to twenty six percent and seed-

ling mortality ranged from 18 to 47 per cent. Seed samples of Trichy and Madras regions recorded low abnormality and mortality.

Drill box survey and evaluation indicated that IR 20 seed samples from Chennimalai, Erode, Nambiyur and Vellakoil were free from nematode infection.

MAIZE

A manurial schedule of 135.0:67.5: 35.0 kg NPK/ha over basal FYM (10 t/ha) brought about high seed recovery, cobweight and hundred seed weight.

CUMBU

A manurial dose of 80:40:40 kg NPK/ha recorded high seed weight, rate of germination, field emergence and vigour index in composite CO 7.

GROUNDNUT

Hollow heart disease caused by boron deficiency was associated with single compartment seeds and fungi infection of the cotyledons.

Soaking the pods in carbendazim + thiram at 0.2% for 35 to 45 minutes eliminated *Aspergillus flavus* and *Aspergillus niger*.

BRINJAL

In the background of maternal and paternal influence on seed quality, SM 115 was the best parent for hybridisation work and CO 1 x MDU 1 was the best cross.

LEUCAENA

The number of seeds per pod, weight of seeds per pod and hundred seed weight exhibited linear relationship with age.

COTTON

Seeds of MCU 9 was highly sensitive to acid treatment. Acid treatment followed by treatment with lime solution (5%) neutralised residual acidity and enhanced the germination, vigour and shelf life of seed.

Irrigating seed crop at 0.5 IW/CPE ratio proved ideal and soil moisture lower than this resulted in decreased kapas yield, seed yield, seed germination, vigour index and storability.

Invigourating one year old delinted seeds of MCU 5 and DCH 32 with water or disodium phosphate (3.59 g/ 100 l) or Dithane M-45 (0.5%) for two hours and drying them to original weight improved storability for a further period of eight months.

PAPAYA

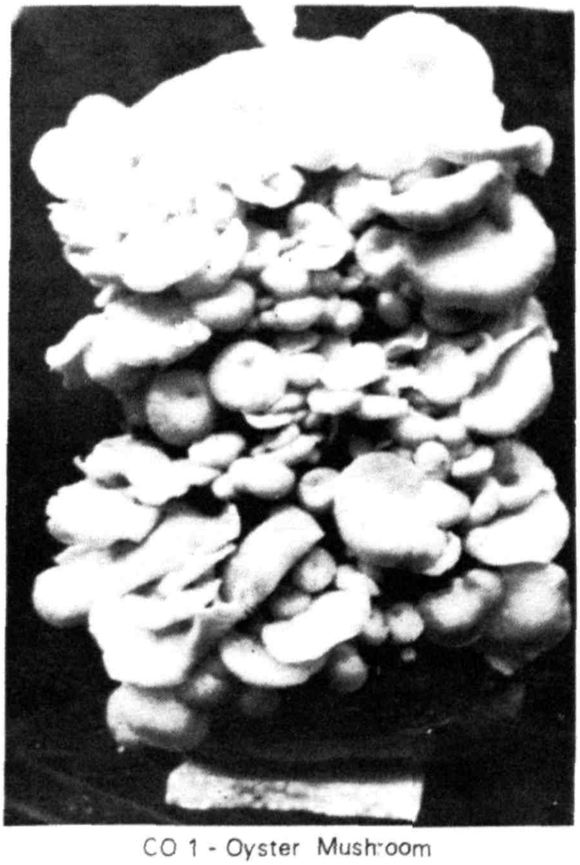
Seeds ratained by BSS 6x6 wire mesh sieve showed good germination, speed of germination, root and shoot length and vigour index. Paper aluminium foil polyethylene laminated pouch proved to be the best for storing the seeds.

Acacia auriculiformis

Sacrifying the seeds with H_2SO_4 (50 ml/kg) for 40 minutes effectively removed hardiness. Thermal scarification was not useful.

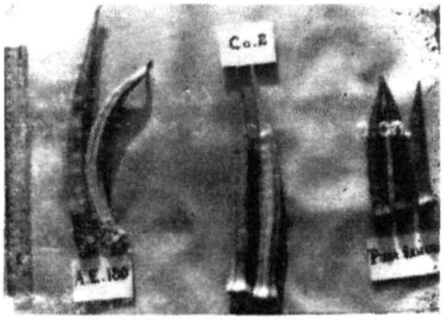
To produce elite seedlings polypot of 25x13 cm ranked the best.

Blackgram - Vamban 1



CO 1 - Oyster Mushroom

Apple Kodaikanal Beauty



Hybrid Bhendi Co. 2

Geranium Kodaikanal

BLUE LUPIN

Collection of seeds at yellow pod stage resulted in better seed quality than green and brown colour stages.

ACID LIME

Extraction of seeds from fruits of seven to nine year old trees showed good quality, vigour and viability. Medium to extra large sized fruits were ideally suited for seed purpose.

HORTICULTURE

POMOLOGY

APPLE

Crop Improvement

Variety Released

KK 1 : This is a clonal selection from the variety Parlins Beauty. The tree is of medium size with a yield of 22 t/ha. It is a mid season variety suitable to warm-winter conditions. The fruits are of medium to big in size (7-9cm in diameter) weighing 180 g each. Fully ripened fruits are attractive yellow in colour with a crimson drop. The fruits are tasty with a TSS of 13° brix.

BANANA

Crop Management

In Poovan, under wet land conditions at Trichy, nitrogen at 125 g/plant recorded earliness in shooting, maturity and harvesting irrespective of P and K level. Plants receiving 125:45:300 g NPK per plant per year recorded good yield of 17.0 kg bunch.

In 'Monthan' three split applications at 3rd month, 5th month and at the time of shooting recorded early shooting and early maturity with high yield. Increased yield of 20.4 kg/bunch was recorded in three-split application (115: 35:330 kg NPK/ha) treatment, while the two-split application treatment gave only 16.9 kg/bunch.

GRAPES

Crop Management

The studies conducted to fix up the level of fruitful buds in Pachadraksha revealed that pruning canes to four or five bud level in summer crop and three or four in monsoon crop gave the maximum yield.

CITRUS

Crop Management

The study on the nutrient requirement of acid lime revealed that application of 600 g N/tree/year in two splits along with 200 g of P and 300 g of K resulted in maximum height, girth and yield of fruits.

Crop Protection

Significant reduction of twig blight disease intensity was observed by giving four sprayings at an interval of three months with 0.3% copper oxychloride plus pruning of affected parts. The yield increased to 20 kg/tree with a net profit of Rs. 34/tree.

Significant control of acid lime canker was obtained by giving three sprayings with streptomycin 100 ppm plus 0.3% copper oxychloride or Dilon at 0.1%. The cost of spraying per tree per year was Rs. 5/- whereas the incre-

sed yield was 25 kg of fruits resulting in a profit of Rs. 45/tree.

BER

Crop Management

The medium pruning of leaving 75 cm of the secondary stem from the base gave the highest yield of 25.5 kg/tree.

Crop Protection

The black leaf spot was effectively controlled by three sprayings with carbendazim 0.1% at an interval of 15 days from the appearance of the symptom.

OLERICULTURE

BHENDI

Crop Improvement

Variety Released

CO 2 : This is a F1 hybrid bhendi involving two parents, viz., AE. 180 x Pusa Sawani. It is high yielding with a yield of 16.5 t/ha, accounting for 26.30 to 64.05 per cent increase over the other released cultivars, viz., CO 1, MDU 3 and Pusa Sawani. The fruits are fairly long, with 20.5 cm length, 6.8 cm girth and 33 g weight. It is suitable for cultivation throughout the year.

Crop Protection

Application of carbofuran or phorate at 1 kg a.i/ha along with urea 45.6 kg/ha and neem cake 200 kg ha recorded reduction in population of *Helicotylenchus* and *Hoplolaimus* by 71.4% and increased the yield of bhendi by 50.2%.

CHILLIES

Crop Management

In transplanted chilli, application of 120 kg N and 60 kg P per hectare gave the maximum yield of 10.36 t/ha of red ripe pod. This was 40.1% higher than the control.

BRINJAL

Crop Management

At Palur, it was found that a spacing of 90 x 60 cm with 300:75:200 kg NPK/ha was optimum for Annamalai and Pattabiram brinjal varieties.

CASSAVA

Crop Management

Intercropping in CO 1 tapioca with six leguminous crops at Coimbatore indicated that blackgram was found to be a suitable intercrop. This recorded the maximum cost-benefit ratio of 1 : 2 and higher yield of tubers as well.

WINGED BEAN

Crop Management

Spacing trials conducted at Coimbatore in winged bean revealed that 1.0x0.5 cm spacing was found optimum giving the highest green pod yield (7.98 t/ha). Fertilizer application of 40 kg N, 100 kg P and 25 kg K/ha gave the maximum green pod and dry seed yield of 12.58 t/ha and 1.28 t/ha respectively.

GARLIC

Crop Management

In the Zn deficient soils of Kodaikanal, garlic responded well to soil

application of zinc. Zinc in the form of $ZnSO_4$ @ 12.5 kg/ha recorded the highest yield of 12.75 t/ha as against 5.08 t/ha in control.

CHOW-CHOW

Crop Protection

At Thadiyankudisai, application of carbofuran at 1 g a. i. per pit at the time of planting and 90 days after germination reduced the mosaic incidence to 3.5% compared to 13.9% in control.

FLORICULTURE

JASMINE

Crop Management

Pruning *J. sambac* at 50 cm from ground level gave a significant yield of 366 g/plant.

CHRYSANTHEMUM

Crop Management

Studies with graded doses of N and P and uniform dose of K with CO 1 chrysanthemum revealed that a combination of NPK at 20 g/m² gave consistently higher yield (16.85 t/ha).

MARJORAM

Crop Improvement

An optimum fertilizer dose of NPK at 140:110:60 kg/ha along with 20 t/ha of FYM gave maximum herbage of 16.87 t/ha and essential oil recovery of 46.78 kg/ha as against 7.76 t/ha of herbage and 18 86 kg/ha of oil from control.

SPICES AND PLANTATION CROPS

TURMERIC

Crop Management

At ARS, Bhavanisagar application of ferrous sulphate @ 30 kg/ha to soil with calcareous condition [Irugur type soil] increased the rhizome yield by 24.17 per cent (25.18 t/ha).

Crop Protection

Scale infested turmeric rhizomes dipped in 0.1% dichlorvos for 10 minutes and sown after shade drying recorded maximum germination (73.83%).

CORIANDER

Crop Protection

Spraying twice, first at the time of initiation of powdery mildew disease and the next after 10 days with either Karathane 0.1%, Bavistin 0.11% or wettable sulphur 0.25% effectively controlled the disease.

FENUGREEK

Crop Protection

Rhizoctonia solani was isolated and identified as the causal organism of fenugreek root rot. Drenching twice, first at the initiation of the disease and the next one month thereafter, with Bavistin or Brassicol at 0.1% level controlled the disease effectively.

PALMYRAH

Crop Management

Germination improved in palmyrah when the seeds were soaked in water

for three hours (46.7%) as compared to direct sowing (28.3%).

PEPPER

Crop Protection

Insecticidal treatment with phosphamidon 0.085% and carbosulfan 0.025% resulted in 100% mortality in pepper large scales.

GERANIUM

Crop Improvement

Kodaikanal-1 : It is a vigorous variety selected from Algerian type. The average herbage yield is 45.2 t ha in three cuttings and the essential oil recovery is 54.4 kg/ha containing 60.56% geraniol.

Crop Management

Regulation of growth with Alar 1000 ppm increased herbage yield to 7750 kg ha and the essential oil content to 0.135% against control which recorded only 4950 kg/ha of herbage and 0.115% of recoverable oil.

FORESTRY

A study on allelopathic effects of *Eucalyptus*, *Casuarina* and *Leucaena* revealed that DMP of sorghum, cowpea and sunflower was affected and quantum of reduction was maximum in sorghum. *Eucalyptus* caused maximum injury to the associate crops, and sorghum was more susceptible to the phytotoxins.

Scarification of *Acacia planifrons* with 16 ml of H_2SO_4 per 100 g of seed for 25 minutes increased the germination.

Seed rate studies carried out in *Bambusa arundinacea* showed that the number of germinated seedlings increased with increase in seed rate, and increased seedling density did not vitiate seedling quality in terms of shoot extension, root length and collar diameter in 60 - day old seedlings. A seed rate of 25 g/m^2 was found optimum.

Total volume of the *Eucalyptus tereticronis* was increased under high density planting of 40000/ha (305.6 m^3/ha) which was nearly 10 times as much as in the coventional density of 2500/ha (27.1 m^3/ha).

AGRICULTURAL AND RURAL DEVELOPMENT STUDIES

A study was conducted to assess the effect of family size on fragmentation of farm holdings and farm income. Analysis of data from 300 sample farms indicated a positive relationship between family size and number of fragments, while the latter had a negative relationship on net farm income. Number of fragements varied from 1 to 14. Hence, small family concept should be popularised as a measure of poverty elimination.

Changing structure of labour market was studied in eight districts covering 800 labour households. The results showed that a family member of labour household was employed on an average for 25.76 mandays in agriculture, 47.48 mandays in livestock, 32.48 mandays in off-farm activities and 61.83 mandays in non-farm activities. Thus, the employment per year was only 167.55 days, against the full-employment level of 300 days. The permanent labour found employment for

267.18 days in a year. Wage rate varied between Rs. 8 75 and Rs. 13.00 for man and between Rs. 5.60 and Rs. 8.00 for woman. Thus, majority of labour households were below the poverty line and need special programmes to improve employment and income per capita.

The Comprehensive Scheme for studying cost of cultivation of principal crops provided estimates of cost of cultivation of paddy, groundnut and sugarcane. For an average yield of 38.39 q of grain per ha, the cost of cultivation of paddy was Rs 5626/ha, and the net return was Rs. 2117/ha. In groundnut the yield was 11.29 q of (unshelled) pods and the cost of cultivation and net return were Rs. 2286/ha and Rs. 467/ha respectively. Yield per ha of sugarcane was 1003 q of cane. It was obtained at a cost of Rs. 6964/ha to give a net income of Rs. 8540.42/ha.

A techno-economic survey conducted in Dharmapuri district revealed that agriculture contributed 68 per cent of the income (NDP) of the district. The district had poor irrigation facility with 16.07 per cent of net sown area under irrigation. Sericulture was popular in Palacode and Harur taluks. The district had 5000 ha of water-spread fit for inland fish production. Agro-based industries for processing groundnut, tapioca, fruits and vegetables were potential sources of rural employment generation.

Economics of sericulture was studied in 355 farms and 41 reeling units spread over in six districts, viz., Coimbatore, Salem, Dharmapuri, Periyar, North Arcot and Madurai. Net return from silk worm rearing varied from Rs. 5039/ha in Periyar district to Rs. 16675/ha in Coimbatore district. The employment of human labour per ha of irrigated mulberry crop varied from 1124 mandays in Madurai district to 1633 mandays in North Arcot district. Under rainfed condition employment per ha varied from 336 mandays to 1220 mandays.

A study of mixed farming in Chengalpattu district showed that crop production contributed 55 per cent of farm income, while the rest came from milk. Cost of production per litre of milk worked out to Rs. 2.19 and Rs. 2.14 in small and large farms respectively. Output/input ratio was 1.13 in small farms and 1.40 in large farms.

A study was undertaken in five districts, viz., Coimbatore, Periyar, Salem, Trichy and Dharmapuri to know the awareness of farmers about TNAU. The results indicated that only respondents in Coimbatore and Periyar districts know correctly about TNAU. Mass media, friends and neighbours were the major sources of information. Release of crop varieties and dissemination of agricultural information were the services vastly known. Farmers' expectation was for the release of crop varieties of short duration with pest and disease resistance and non-lodging qualities and for information on biogas plants.

Adoption of recommended seed practices by rice farmers was studied. All the sample farmers had fully adopted the recommended seed preservation practice. But, other recommended practices, viz., cement floor for drying seeds, use of polythene bags, treating seeds with thiram, spraying malathion and fumigation of seed rooms were not adopted by most of the farmers.

AGRICULTURAL ENGINEERING

Insect suction trap

An insect suction trap was designed for trapping of insects like hoppers, midges, earhead bugs, white flies and ash weevils alive. The cost of the unit is Rs. 170/-.

Tractor operated hoist

A tractor mounted hoist at a cost of Rs. 1700/- has been developed using a four bar linkage structure actuated by the three point linkage. The unit can be lifted to a height of seven metres by the tracter driver when the operator standing on the platform located at the top of the hoist can reach the top of the trees and prune or pluck the wanted materials.

Device for broadcasting seed, fertilizer and insecticides

Broadcasting seeds, fertiliser and granular insecticides like carbofuran can be uniformly done by this device. The unit disperses the material uniformly by centrifugal force to a distance of 5-10 m by manipulating the rotating speed of the handle. Normally 1.20 ha can be covered per hour. A front mounted unit of this type containing a hopper can be filled with seeds of sorghum/paddy/gingelly or fertilisers like urea for broadcasting. The unit costs Rs. 750/- and weighs about four kg.

Brine applicator

This power tiller mounted brine applicator consisting of a beam of aluminium (section of 5.0x2.5 cm)can spray 20 litres per minute of brine under a pressure of 1.2 kg/cm². The unit can cover a width of 6.5 m when travelling at a height of 75 cm above ground level. The cost of operation is Rs. 14/ha.

Low cost Deenabandhu biogas plant

The unit consists of two segments of spheroid, one at the top and the other at the bottom. The bottom foundation itself forms the bottom segment of the spheroid which just starts from the foundation itself. The inlet is provided with a slanting pipe enabling easy sliding of the slurry. The outlet tank is designed in such a way that it occupies the displaced slurry from the main tank due to building up of gas pressure. The plant can be constructed at a cost of Rs. 3000. As the unit reduces the cost of construction, prevailing TNAU model can be replaced.

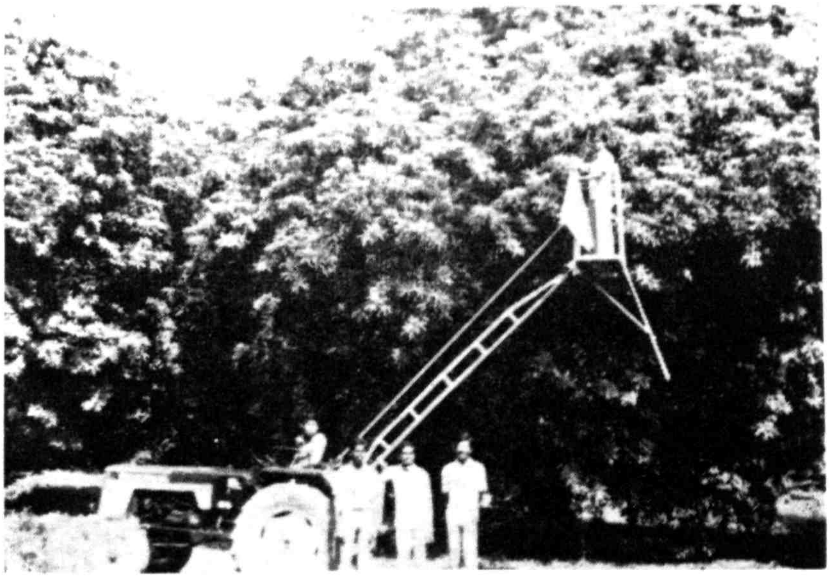
Water closet

The newly developed medium size water closet is made up of cement mortar along with white ash cement. Tests conducted on the prefabricated 1:3 cement mortar rings (two metre diameter) to act as a leach pit by installing them in a pit of two metre diameter with three cm diameter openings in the rings proved efficient. The cost of the closet is Rs. 45/-.

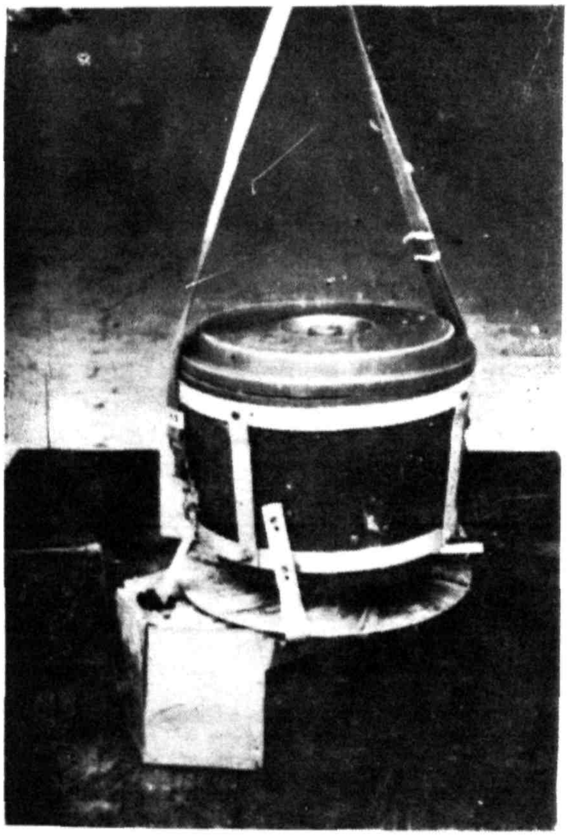
Soil block making machine

A manually operated soil block making machine at a cost of Rs. 2000/- was developed. This machine has a higher mechanical advantage and three different sizes of moulds can be easily fitted in the machine, facilitating production of stabilised soil blocks for pavement/flooring. This machine is capable of producing 250-400 blocks

Tractor drawn seed planter

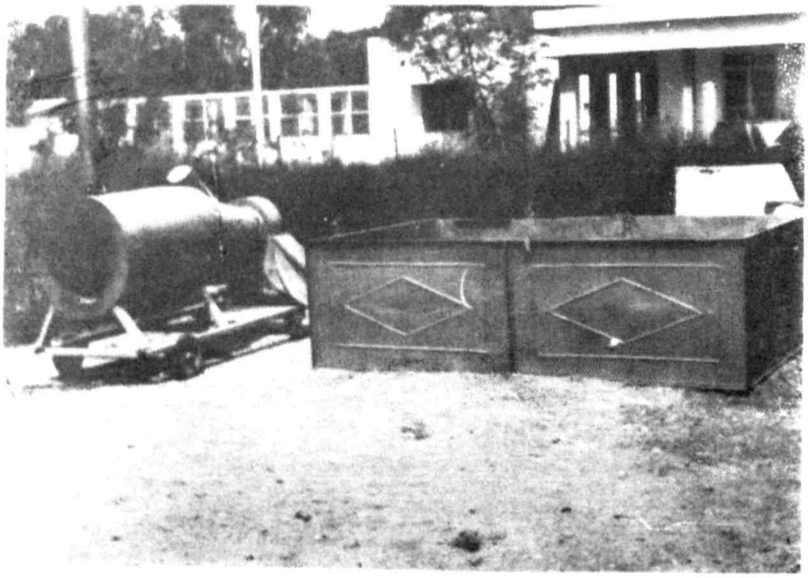


Tractor operated hoist



Broadcasting device

Soil block making - students' project



Copra drier.

per day when four persons are working at site.

Agricultural waste-fuelled furnace for copra drying

A mechanical copra dryer, utilising heat by burning any agricultural waste, has been developed. This consists of a furnace, a blower and a rectangular shaped holding bin. The fire-tube type furnace can generate heat by burning any agricultural waste including coconut husk and shell. This can produce hot air at any desired temperature upto 90° C by suitably mixing the hot air with the ambient air through an adjustable butterfly valve. The unit is provided with rubber wheels for easy transportation. The field tests have shown that a batch of 2500 nuts at 50% moisture can be dried to 7% resistance within 20 hours at an optimum drying air temperature of 65°C and an air flow rate of 25m³/minute as against seven to eight days in conventional method of sun drying. The manufecturing cost of copra drier including all accessories is Rs. 12,000/-. The cost of drying one tonne of coconut in the mechanical dryer works out to Rs. 356/- as against Rs. 204/- in sun drying. The quality of the dried product is found to be superior to sun dried product. Besides, the drying can be done throughout the year, irrespective of weather conditions.

Puffing cum roasting machine for sorghum and groundnut

A hand operated continuous type roasting machine has been developed to puff sorghum as well as to roast groundnut. Five kg of sand is placed in the rotor and heated for about 25 minutes. After the sand has attained a temperature of 200°C, sorghum grain with an initial moisture content of 11-12% (wet basis) is fed through the hopper and the puffing drum is rotated manually at 6-8 rpm. The puffed sorghum is collected at the outlet continuously. The capacity of this machine is 30 kg/hr. The cost of the unit is Rs. 2000/-.

Improved *gorru* for applying seed and fertilizer

This is a three-row bullock drawn implement operated by three men labour, one each for operating the implement, dropping seeds and feeding fertilizer. Seeds and fertilizers are applied simultaneously. The furrow opener is similar to country plough with adjustable share point. It can cover an area of 1.0 to 1.2 ha in a day of eight hours. The cost of the unit is Rs. 400/-. The cost of opetation works out to Rs. 70/ha as against Rs. 145/ha in the conventional method using country plough.

Bullock operated improved seed planter

This unit consists of three furrow openers with adjustable share points. The row to row distance can be adjusted from six to twelve inches in steps of three inches and the seed to seed distance can be adjusted by fixing suitable sprockets. This can cover an area of 1.0 to 1.2 ha in a day of eight hours. The cost of the unit is Rs. 1,000/-.

Seed planter attachment to tractor drawn cultivator

A seed drill attachment to tractor drawn cultivator for sowing groundnut has been designed. This unit can cover an area of 4.0 ha in a day of eight

b) Water loss and nitrogen loss increased with increase in the depth of submergence.

c) Water loss and nitrogen loss were less during *thaladi* season compared to *kuruvai* season because of the rise in water table during *thaladi* season which reduced the rate of percolation.

d) Leachate collected at two levels of depth (15-30 cm and 30-45 cm) did not show much variation in nitrogen content.

Trials conducted at Thanjavur on conjunctive use of water indicated that in canal irrigated area, groundnut - rice - gingelly crop sequence (in *kharif*, *thaladi* and summer respectively) recorded the highest net return of Rs. 19,954/ha with minimum water requirement of 915 mm. Blackgram or greengarm could also be raised as relay crop instead of gingelly in summer. In assured water supply situation the crop sequence of groundnut - rice - groundnut (in *kharif*, *thaladi* and summer respectively) recorded the highest net return of Rs. 23,046 /ha with minimum water requirement of 1584 mm.

Studies on water and fertilizer production function on blackgram and gingelly revealed that blackgram receiving 211 mm of water through four irrigations (at sowing, 15, 30 and 45 days after sowing) with 45 kg P_2O_5/ha recorded the maximum yield of 520 kg/ha which was 140 per cent higher than the control (irrigation at sowing, and no P_2O_5).

A study on the effect of time of planting on yield of rice showed that maximum yield (6830 kg/ha) was obtained when the planting was taken up around 15th June and the lowest yield (3942 kg/ha) was obtained when the crop was planted at the end of August.

Water use study in rice under varying soil fertility at Madurai indicated that impounding water at 5cm depth one day after the disappearance of ponded water with 120 kg N/ha gave high yield of 6652 kg/ha during *rabi* season.

An experiment conducted at Madurai in chillies with three irrigation methods and three irrigation regimes showed that irrigation methods did not influence the yield of chillies. Among the irrigation regimes 0.75 and 0.60 IW/CPE ratios were found to be significantly superior to 0.45 ratio but maximum yield (24.8 q/ha) was obtained at 0.75 ratio. The interaction showed that irrigation through alternate furrows with a ratio of 0.60 produced a water use efficiency of 43.5 kg/ha cm of water.

Studies on water use by crops (pure and intercropping stands) were conducted at Madurai. They showed that groundnut intercropped with direct seeded cotton under 0.60 IW/CPE ratio with 4 cm depth gave higher net monetary return than other cropping systems namely, pure cotton, pure groundnut and groundnut with transplanted cotton.

Comparison of sprinkler irrigation with surface method of irrigation in groundnut showed that yield of groundnut could be improved marginally with sprinkler irrigation with a saving of 25 per cent irrigation water in both *kharif* and *rabi* seasons.

VETERINARY AND ANIMAL SCIENCE

Cattle and Buffaloes

In cattle, two or three spermatozoa specific antigen and five to six spermatozoal antigens were identified and resolved by immuno-electrophoresis technique. There was no cross reaction between semen and normal rabbit and bovine sera, confirming the antigent to be specific to semen only.

Studies on certain biochemical aspects of buffalo semen and their relationship with freezability revealed significant positive correlation of high initial motility, live sperm percentage, initial fructose level and fructolysis index, and low cholesterol and potassium in semen with freezability. Minor variations in the bio-chemical constituents, exhibited due to season, had no influence on freezability.

Research conducted on evolving suitable tissue culture media for optimum mitotic index for Karyological studies in bovines revealed that best results were obtained with RPMI 1640 followed by T. C. 199 + L. Glutamine and T.C. 199. The differences between media were significant. The efficacy appeared to be dependant upon nutrient availability in the media and there was positive association between mitotic drive and mitotix index.

Subabul leaf meal had no deleterious effect on the growth of animals, but it was advisable to restrict the replacement of concentrate upto 25% by subabul leaf meal in growing calves. The weed, *Celosia argentea* commonly known as *pannai keerai* could be beneficially fed to bullocks, along with paddy straw on 50:50 dry matter basis after enriching it with urea and molasses.

The presence of fungal spores in jowar stalks resulted in abortion at the 7th month of pregnancy in buffalo. The abortions were due to toxic substances released due to consumption of fungal spores present in the jowar stalks. The toxins produced were not found to be detrimental to the adult buffaloes but found lethal to the foetuses.

A study conducted on mortality among calves in some of the government farms in Tamil Nadu revealed that Sindhi calves recorded the highest mortality and the lowest mortality was seen in Tharparker breed. The mortality rate was higher among male calves than female calves.

Sheep and Goats

Comparative growth performance between Mecheri pure bred progeny and Dorset quarter bred progeny was studied and found that the Dorset quarter bred progeny had better birth weight and higher rate of growth than the pure bred Mecheri.

Pigmented spots in White Fleece Nilagiri and its crosses appeared to be inherited in a multifactorial manner. Its heritability ranged from 0.2 to 0.5 in the population studied. Its incidence in the general population was around 10 to 15 per cent and more than two thirds of the sire families were affected.

Treatment of rain tree fruit with water lime and sodium hydroxide did not have any effect on weight gain in sheep

The study on the myo-fibrillar and connective tissue components of sheep meat brought out proof of the tenderising influence of heat treatment on tough mutton and it gave hint of the relative antagonistic effect on the tenderness due to myo-fibrillar coagulation (contraction) and gelatin of collagen.

Studies carried out on qualities and acceptabilities of curried and canned mutton and chevon (microbiological results) revealed that canned products were in an almost sterile condition and free from contamination. Taste panel trials revealed an overall acceptability of both types of meat totally safe upto 90 days under room temperature.

Swine

To aid selection programme, heritability estimate ± SE of 0.1659 ± 0.0290 were obtained for number born alive and 0.1225 ± 0.0298 for number weaned. In view of the low values obtained it seemed that only limited amount of mass selection for litter size in swine could be justified. The repeatability of all the three litter traits were low (0.1292 ± 0.436, 0.0707 ± 0.3022 and 0.0631 ± 0.2202 for the total number of piglets born, number born alive and number weaned respectively.

Poultry

A comparison of diluents for cryopreservation of rooster semen was studied and found that TRIS of 6.75 pH was found significantly superior in preserving sperm motility at 0 hour and after 24 hours of storage at 5 C. New Hampshire's semen always showed a higher motility than White Leghorn, immediatately after dilution (0 hour) and on storage for 24 hours at 5°C. Tris as buffer and dimethyl sulphoxide and glycerol each at 2.00 per cent level as cryoprotectives, equlibrated for two hours for New Hampshire semen, and Tris as buffer and glycerol at 2.00 per cent level as cryoprotective equilibrated for 2 hours for White Leghorn semen were found to be the best combination. Significantly superior revival rates on freezing were observed with New Hampshire semen with Tris (6.75) buffer.

Immediate wing web vaccinations during the peak outbreaks of Ranikhet disease (Kumauon strain of RDVK vaccine) resulted in control of the severity of the disease. The laying performance of the flock was also regained early.

Aggravated incidence of coccidiosis (both caecal form and intestinal form) when B-Complex vitamins were administured for poultry was identified. It was recommended that B-Complex vitamins should be withdrawn immediately on the onset of coccidiosis outbreak in poultry farms.

A study conducted at Poultry Research and Development Centre, Pudukkottai on the performance of different strains of broilers concluded that 6th week of age was the suitable age for the marketing of broilers.

Colibacillosis, non-specific enteritis, coccidiosis and yolk sac infection were found to be the major problems encountered in Pudukkottai area. If proper brooding of chicks could be carried out by the poultry farmers along with adequate water sanitation majority of the disease problems could be solved in this area. Proper litter care and addi-

tion of proper coccidiostats would relieve the problem of coccidiosis.

The total returns realised in duck hatching units ranged from Rs. 252.91 to Rs. 262.62 per 100 eggs of which sale proceeds from ducklings constituted about 90 per cent. Net returns worked out to Rs. 77.26 to Rs. 82.04 per 100 eggs and Rs. 1.05 to Rs. 1.14 per duckling respectively. Gross return per rupee invested was observed to be in the range of Re. 0.43 to Re. 0.48.

FISHERY SCIENCE

Polyculture of fin and shell fishes in brackish water

Experiment on polyculture of fin fishes indicated that *Variola louti*, a marine species showed the best growth of 170 g in four months, followed by *Mugil* sp. (132.5 g in four months). Although *Etroplus suratensis* registered the least individual growth rate (89 g), they contributed about 50.8 per cent of the total fish production of 3013 kg/ha/yr.

Studies on the growth of white prawns, *Penaeus indicus* in net cages of 3 x 2 x 1 m installed in the open area of Pullavazhi brackish water under a stocking density of 50 prawns/m^3 indicated that prawns grew to an average size of 47.5 mm and 0.58 g. The estimated production of 0.32 kg/m^3 which was equivalent to 3200 kg/ha was achieved from this trial within three months. The survival rate was found to be 60.3%.

The polyculture of *Mugil* sp and *Penaeus indicus* was attempted in the expeimental double layered pen of 15 m^2 for about 90 days. The *Mugil sp.* recorded an increment weight of 13.5 g and *P. indicus* 13.3 g. The poor growth was attributed to the high stocking density of these species (33,000 Nos. of *Mugil* sp. per ha and 76,000 Nos. of *P. indicus*/ha), absence of supplemental feeding and drop in salinity associated with heavy rains.

Composite fish culture

In sewage fed ponds, *Tilapia* showed relatively better growth (65 g) than in control ponds (47.0 g) without any supplemental feed.

In composite fish culture silver carp showed higher growth (860 g in 5 months) than other carps under same conditions.

Preparation of smoke cured fish

Procedure for the quality assessment of smoked fish was standardised. The procedure for estimating the biochemical parameters like protein, fat, NaCl, TMA, VBN, moisture and ash, and microbiological aspects like TPC and total fungi was also standardised.

Economics of inland fish farming

A field survey conducted in Tirunelveli district with 30 inland fish farmers revealed the following :

a) motivation for fish farming came from FFDA and Co-operatives; b) the area of the fish tank varied from 0.35 ha to 12.00 ha; c) all the fish tanks were leased from panchayat / temple/ private parties by the fish farmers and none of them owned fish tanks; d) Out of the 30 respondents, 17 depended primarily on fish farming for their in-

come; e) the average cost of production of fish worked out to Rs. 841/ha. The cost ranged from Rs. 508/ha to Rs. 2585/ha among the fish farmers; f) the yield gap (potential *minus* actual) ranged from 2018 kg/ha to 2729 kg/ha; g) weeds, weedy fishes, fish diseases and poaching were the major constraints in inland fish production; and h) none of the respondents adopted the recommended practices of composite fish culture and organic and inorganic manuring.

Employment, income and consumption level in fishing labour households

A survey conducted in Tirunelveli district on standard of living of fisherman families revealed the following: a) the size of fishing labour household was 5.56; b) the rate of illiteracy was 27 per cent; c) the mean size of household labour force was two; d) an earner got employment for 267 days in a year; e) the annual income was Rs. 13773 per household and Rs. 2491 per capita. About 90 per cent of the income came from fishing; f) the annual expenditure was Rs. 11391 per household and the major items of expenditure were food, narcotics and liquor; and g) the annual savings was Rs. 435 per capita.

5. EXTENSION EDUCATION

The Directorate of Extension Education takes a lead in expeditious dissemination of innovations emanating from various research centres to the field level. The extension strategies adopted by its key centres during 1986-87 are detailed below:-

Krishi Vigyan Kendras

The six Krishi Vigyan Kendras at Coimbatore, Madurai, Pondicherry, Trichy, Vridhachalam and Kattupakkam conducted on-campus and off-campus training programmes on agriculture and allied activities. A total of 500 training programmes was conducted and the beneficiaries included 11270 farmers, 3267 farm women, 2877 extension workers, 594 teachers, 528 students and 394 other categories of personnel. In addition, these centres carried out 479 demonstrations, 92 group/village meetings, 22 farm/field days/visits, 6 farm days and 286 farm advisory services and answered 397 farmers' queries. Besides, 38 articles were published in dailies/farm magazines, 42 radio programmes/announcements were broad cast, 6 TV programmes were telecast, 37 publications were brought out and 69 slide/film shows and 56 exhibitions were organised as part of their mass media utilisation activity.

Plant Clinic Centres

The staff of the five Plant Clinic Centres at Vellore, Tirunelveli, Tirur, Salem and Srivilliputhur periodically visited the farmers' holdings, identified pest and disease problems and suggested suitable remedial measures. These clinics also conducted on-farm testing of pre-release cultures of various crops, management practices and plant protection methods besides undertaking surveillance work for the purpose of forecasting the outbreak of pests and diseases.

The Plant Clinic Centres carried out 124 trainings. The beneficiaries included 1809 farmers, 299 farm women, 2340 extension workers, 25 students and 36 other categories of personnel. With respect to individual and group contacts, 83 demonstrations, 48 village / group meetings, five field days and one farmers' day were organised. Other major achievements related to carrying out of 1467 farm advisory services and answering 96 farmers' queries. To supplement their extension activities publishing of 38 articles in dailies and farm magazines and 20 publications, 37 radio broadcasts and 2 T. V. programmes were undertaken, besides organising nine slide / film shows and eight exhibitions for the benefit of the farmers.

Poultry Research and Development Centres

The Poultry Research and Development Centres at Madurai, Namakkal, Pudukkottai, Tiruppur, Trichy and Raja-

palayam undertook six training programmes, 12 demonstrations, 10 village/group meetings, 945 farm/field days/visits, 2295 farm advisory services and 3199 post-mortems and 950 samples were screened for various diseases. They also published 42 articles in dailies and organised 12 radio programmes, one T. V. programme, seven slide / film shows and eight exhibitions.

Livestock Research and Development Centres

The Livestock Research and Development Centres at Erode, Nagercoil, Thanjavur, Tirunelveli and Dharmapuri conducted 197 group/village meetings, 385 farm/field days/visits, 485 farm advisory services and answered 2042 farmers' queries besides publishing 38 articles in dailies/farm magazines and broadcasting 19 radio programmes. They also conducted 485 post-mortems and 49 minor and major operations and examined 428 animals and 13576 clinical materials.

National Demonstration Scheme

The ICAR sponsored scheme at Salem during 1986-87 organised a total of 55 demonstrations consisting of 26 rainfed groundnut and 29 irrigated crops. It also conducted 72 farm / field days / visits. Five radio programmes were broadcast and four publications were brought out. Under National Oilseeds Mission, Scientists collaborated with the Department of Oilseeds for successful organisation of six compact block demonstrations.

All India Coordinated Project on Scheduled Caste Area Research

The All India Coordinated Project on Scheduled Caste Area Research was functioning at Aruppukottai. The project aims at improving the socio-economic conditions of the scheduled caste people. In this line of approach, 27 training programmes benefiting 225 farmers, 118 farm women, 25 extension workers and 408 teachers were conducted. In addition, 25 village/group meetings, 24 demonstrations, one radio programme, four exhibitions and two slide/film shows were conducted and six publications were brought out.

Communication Centres

The Communication Centres at Coimbatore and Madras disseminated the innovations of the University by conducting seven training programmes, 15 demonstrations, one farmers' day, 202 farm advisory services and answering 471 farmers' queries. Under mass media utilisation strategies 63 articles were published in dailies/farm magazines, and 65 radio programmes were broadcast. Fifty six T. V. programmes announcements were telecast and 49 slide/film shows and seven exhibitions were organised.

Lab-to-Land Programme

Under the Lab-to-Land programme of the ICAR, 300 farm families were adopted by the TNAU centres. The Krishi Vigyan Kendras at Coimbatore, Madurai, Trichy, Pondicherry, Vridhachalam and Kattupakkam were allotted 50 families each. Technical guidance and input support were rendered by the Kendras to the families in agriculture, animal husbandry, home science, agricultural engineering, sericulture etc. The details of input support given for the adopted villages are given below :

Seed Supply

Paddy	15,314 kg
Millets	2,867 kg
Pulses	36,800 kg
Oilseeds	8,735 kg
Vegetables	580 kg
Fertilizers	56,254 kg
Banana suckers	1,004 Nos.
Subabul seedlings	200 Nos.

Chemicals

Delchlor	100 *l*
BHC 10% Dust	11.4 t
Ekalux	50 *l*
Endosulfan	60 *l*
Cuman L.	75 *l*
Endocron	60 *l*
Planofix growth regulator	30 *l*
Furadon	112 kg
Other pesticides	170 *l*

Tools and Implements

Crow bars	498 Nos.
Mummatty	728 Nos.
Sprayers	30 Nos.
Dusters	17 Nos.
Honey extractor	2 Nos.
Folding knife	35 Nos.

Other Centres

The colleges and research stations of the Tamil Nadu Agricultural University functioning in different parts of the State also attended to the extension education activities by organising trainings, demonstrations, exhibitions and farmers' day in addition to farm visits on specific problems of farmers.

Distant Learning Programmes:

Farm School on AIR

The lessons relating to reclamation of alkaline and saline soils, sterility in cattle, micronutrients and agro - based industry were offered under Farm School on All India Radio benefiting 2818 registered farmers directly and other farmers indirectly.

The contact programmes for dry farming, integrated weed management, reclamation of alkaline and saline soils and sterility in cattle were held at the Regional Research Station, Aruppukottai; Soil Salinity Research Centre, Trichy and Madras Veterinary College, Madras. More than 300 farmers participated and were benefited.

Correspondence course

Twelve courses on new method of Plant Protection, Modern Poultry Farming, Farm Budgeting, Vegetable Cultivation, Flower Cultivation, Banana Cultivation, Sericulture, Processing and Storing of Farm Products, Turmeric Cultivation and Forage Crops were offered and 299 farmers were benefited. A three-day contact programme was organised for these courses and 74 farmers participated in it.

Training unit

The Training Unit of the Directorate of Extension Education conducted 45 T & V training programmes benefiting 854 extension personnel during 1986 87. The topics covered were agro-climatology; weed management; bio - fertilizers; pest surveillance; agronomy of millets; agronomy of rice; watershed

development programme; agronomy of horticuture, oilseeds and cotton; dry farming, forage crops; agro - forestry; seed technology and information management.

Information support

The extension centres provided information support in various forms besides publishing monthly and quarterly journals.

Valarum Velanmai : This is a Tamil monthly journal published by the Communication Centre, Coimbatore with 8000 to 10000 subscribers. It published 202 articles during the year under report.

kalnadai Kathir is a Tamil quarterly journal in animal sciences published by the Veterinary College, Madras. About 10,000 copies were printed and distributed to farmers and field personnel during 1986 - 87.

Uzhavar Thunaivan : The Agricultural College and Research Institute, Madurai brings out this Tamil monthly journal. It published 110 articles during the period under report.

TNAU Newsletter : The monthly newsletter carries latest research articles in brief and also the activities and training programmes carried out by various wings of the University. Nearly 1000 copies were sent every month to various agricultural universities, research organisations and eminent scientists in the country and abroad.

Breeder Seed Production

During 1986 - 87 the quantity of breeder seed produced was as follows :

Crop	Quantity (kg)
Paddy	9230
Sorghum	120
Bajra	10
Ragi	4
Maize	12
Blackgram	11390
Greengram	2750
Redgram	350
Cowpea	1200
Bengalgram	100
Horsegram	100
Lablab/Mochai	190
Groundnut	84185
Gingelly	150
Sunflower	1800
Castor	150
Vegetables	150
Forages	300
Sugarcane (in tonnes)	3660

Adaptive Research Trial/Multi - Location Trial. II

During 1986-87, a total of 92 cultures of 16 crops was evaluated in farmers' holdings over 1825 locations. The results of ART and MLT. II relating to the year 1985-86, were compiled and broughtout in the form of a book entitled "Performance of Cultures in Farmers' Holdings" 1987.

On - farm Trials

On-farm trials on management practices were conducted in 149 locations. The plant protection staff of the State Department of Agriculture and University extension personnel also conducted on - farm research on 13 selected plant protection topics.

TABLE : 1 NO. OF TRAININGS CONDUCTED BY TNAU EXTENSION CENTRES (1986 - 1987)

S.No.	Centre	No. of trainings	No. of beneficiaries					
			Farmers	Farm women	Extn. workers	Teachers	Students	Others
1.	KVK, Coimbatore	57	804	461	145	444	—	—
2.	KVK, Madurai	40	759	234	428	—	—	195
3.	KVK, Pondicherry	98	1692	574	130	—	—	100
4.	KFSC, Trichy	81	1625	831	1248	—	274	—
5.	KVK, Vridhachalam	137	4246	654	326	146	100	66
6.	KVK, Kattupakkam	87	2144	513	600	4	154	33
7.	PCC, Vellore	10	810	20	815	—	—	—
8.	PCC, Tirunelveli	21	180	74	—	—	25	—
9.	PCC, Tirur	22	374	130	280	—	—	—
10.	PCC, Salem	27	200	75	720	—	—	—
11.	PCC, Srivilliputhur	44	245	—	525	—	—	36
12.	RRS, Paiyur	7	330	—	—	—	—	—
13.	RRS, Aruppukottai	27	225	118	25	408	—	—
14.	HRS, Thadiyankudisai	9	200	100	—	—	—	—
15.	TRRI, Aduthurai	2	—	—	47	—	—	—
16.	Commn. Centre, Madras	7	—	—	105	—	—	—
17.	PRDC, Trichy	6	63	—	—	—	—	—
	Total	682	13897	3784	5394	1002	553	430

TABLE : 2 NO. OF INDIVIDUAL / GROUP CONTACTS CONDUCTED BY TNAU EXTENSION CENTRES

S. No.	Centre	Method demons-trations	Village mee-tings	Farm/ Field days/ visits	Farmers' days	Farm Advisory Service	No of queries answered
1.	KVK, Coimbatore	70	12	5	1	144	182
2.	KVK, Madurai	73	17	5	1	21	70
3.	KFSC, Trichy	29	—	—	1	70	28
4.	KVK, Vridhachalam	286	63	12	2	31	75
5.	KVK, Kattupakkam	21	—	—	1	20	42
6.	PCC, Vellore	21	6	—	—	153	6
7.	PCC, Tirunelveli	21	15	—	—	184	30
8.	PCC, Tirur	8	11	—	—	419	60
9.	PCC, Salem	24	16	5	—	230	—
10.	PCC, Srivilliputhur	9	—	—	1	481	—
11.	NDS, Salem	55	—	72	—	—	—
12.	RRS, Paiyur	42	—	—	1	—	—
13.	RRS, Aruppukottai	13	25	—	—	—	—
14.	HRS, Thadiyankudisai	3	—	—	—	—	—
15.	TRRI, Aduthurai	8	5	4	1	6	—
16.	Commn. Centre, Coimbatore	—	—	—	—	—	471
17.	Commn. Centre, Madras	15	—	—	1	202	—
18.	PRDC, Madurai	1	—	—	—	291	403
19.	PRDC, Namakkal	11	—	—	—	400	1629
20.	PRDC, Pudukkottai	—	—	286	—	—	568
21.	PRDC, Tiruppur	—	—	338	—	1366	—
22.	PRDC, Trichy	—	2	308	—	—	1091
23.	PRDC, Vellore	—	8	13	—	338	641
24.	LRDC, Erode	—	20	—	—	485	—
25.	LRDC, Nagercoil	—	41	40	—	—	500
26.	LRDC, Thanjavur	—	10	257	—	—	355
27.	LRDC, Tirunelveli	—	30	88	—	—	1147
	Total	710	281	1433	10	4841	7298

TABLE. 3. NO. OF MASS MEDIA UTILISATION PROGRAMMES DONE BY TNAU EXTENSION CENTRES

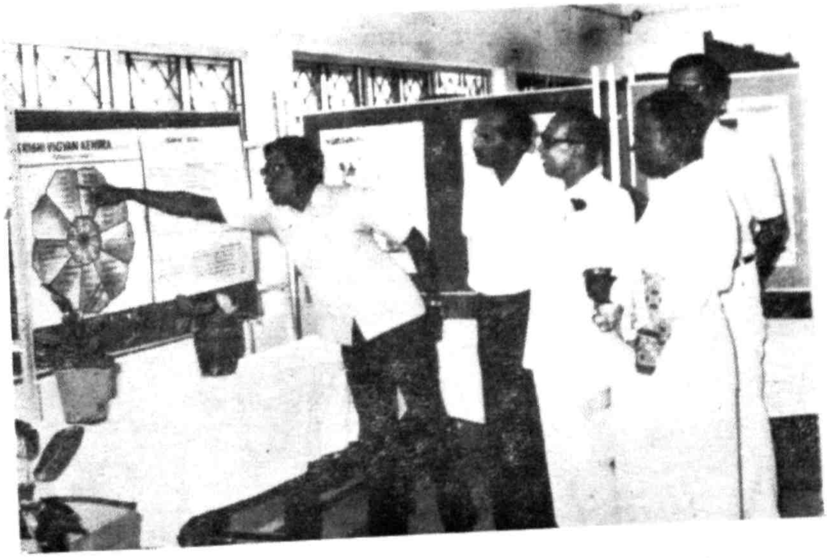
Sl. No.	Centre	Writing to dailies & farm magazines	Radio Programmes and Announcements	T. V. Programmes and announcements	Publications (leaflets, folders etc. broughtout)	Slide / Film shows	Exhibitions
1.	KVK, Coimbatore	7	23	—	—	2	8
2.	KVK, Madurai	8	7	—	4	20	6
3.	KVK, Pondicherry	9	—	—	13	23	—
4.	KFSC, Trichy	4	4	—	10	—	4
5.	KVK, Vridhachalam	7	4	1	3	23	34
6.	KVK, Kattupakkam	3	4	5	7	1	4
7.	PCC, Vellore	3	13	1	1	3	1
8.	PCC, Tirunelveli	14	5	—	5	2	6
9.	PCC, Tirur	5	7	1	—	—	—
10.	PCC, Salem	12	6	—	8	—	—
11.	PCC, Srivilliputhur	4	6	—	6	4	1
12.	NDS, Salem	—	5	—	4	—	—
13.	RRS, Paiyur	9	—	—	12	—	—
14.	RRS, Aruppukottai	2	—	—	—	2	4
15.	HRS, Thadiyankudisai	5	3	—	3	—	—
16.	TRRI, Aduthurai	20	13	2	19	—	—
17.	Commn. Centre, Coimbatore	57	52	54	—	29	6
18.	Commn. Centre, Madras	6	13	2	—	20	1
19.	PRDC, Madurai	9	1	—	—	1	—
20.	PRDC, Namakkal	3	2	—	—	—	—
21.	PRDC, Pudukkottai	6	—	—	—	—	—
22.	PRDC, Trichy	18	9	—	—	4	1
23.	PRDC, Vellore	6	—	1	4	2	—
24.	LRDC, Erode	9	—	—	—	—	—
25.	LRDC, Nagercoil	7	—	—	—	—	—
26.	LRDC, Thanjavur	12	3	—	—	—	—
27.	LRDC, Tirunelveli	10	6	—	—	—	—
	Total	255	186	67	99	136	76

Vice-Chancellor Visiting Field Day Exhibition.

Farmers' Day at Rice Research Station, Ambasamudram.

Demonstration of Furadan Application to Banana Suckers by PCC Staff, Vellore.

Field Demonstration to Farmers - Krishi Vigyan Kendra, Pondicherry



Vice-Chancellor at the Krishi Vigyan Kendra, Pondicherry

Farmers' Day Celebration at Agricultural Research Station, Kovilpatti
Discussion during Field Visit

Farmers' Day Celebration at Agricultural Research Station, Kovilpatti

Mrs. Swarna Rajagopalan Lighting the Kuthuvilakku in the Exhibition Stall, Agrl. College & Research Institute, Madurai

Method Demonstration in Mushroom Cultivation

Lab-to-Land programme - Training in Helispray use at Aruppukottai.

Demonstration of TNAU Improved Gorru

APPENDIX I

CIVIL WORKS COMPLETED IN 1986 - 87

Main Campus, Coimbatore

1. Glass House
2. Zoo building
3. Hostel
4. Laboratory building

Agrl. College & Research Institute, Madurai

Screen house

Agricultural College, Killikulam

1. Laboratory I
2. Laboratory II
3. Administrative block
4. Lecture hall
5. Farm building
6. Canteen block
7. Hostels
8. Toilet block

Fisheries College, Tuticorin

1. Extension of hostel
2. Hatcherv unit

Veterinary College, Namakkal

Shed

Agricultural Research Station, Bhavanisagar

1. Staff quarters - 7
2. T & V meeting hall
3. Implement shed

Agricultural Research Station, Kovilpatti

1. Staff quarters - 4
2. T & V meeting hall

Horticultural Research Station, Periyakulam

Laboratory

Poultry Research Station, Teynampet

1. Brooder house
2. Layer house
3. Staff quarters - 3

Regional Research Station, Paiyur

Staff quarters - 7

Tamil Nadu Rice Research Institute, Aduthurai

1. Trainees' hostel
2. Laboratory
3. Glass house
4. Field lab and open shed
5. Staff quarters - 16

Kumaraperumal Farm Science Centre, Trichy

1. Laboratory
2. Glass house
3. Field lab
4. Cattle shed
5. Garage
6. Godown
7. Thrashing floor
8. Staff quarters - 16

National Pulses Research Centre, Pudukkottai

Farm Development Fencing

Regional Research Station, Aruppukottai

Staff quarters - 7

Horticultural Research Station, Thadiyankudisai

1. Laboratory
2. Livestock shed
3. Implement shed
4. Drying floor
5. Rat proof godown
6. Glass house
7. Staff quarters - 9
8. Trainees' hostel

APPENDIX-II

LIST OF SCHEMES

University Research Schemes - Non - Plan

		1986 - 87 Revised Estimate (Rs.)
1	Scheme for Improvement of Groundnut through Induction of Mutation, Coimbatore	72,000
2.	Scheme for Surveillance of Pests and Diseases, Vellore	84,000
3.	Scheme for Studies on the Residues of Pesticides in Plant and Soil, Coimbatore	2,11,000
4.	Scheme for Research on Citrus Die-back, Tenkasi	1,20,000
5.	Scheme for Research on Citrus Die-back, Coimbatore	51,000
6.	Scheme for Intensification of Pulses Research, Vamban	66,000
7.	Scheme for Improvement of Redgram and Soybean, Vamban	51,000
8.	Scheme for Evolution of Cumbu Resistant to Green Ear, Vamban	10,800
9.	Scheme for Evolution of Cumbu Resistant to Green Ear, Kovilpatti	11,000
10.	Scheme for Maximisation of Pulses Production, Vamban.	41,000
11.	Scheme for Improvement of Millets for Grain and Fodder, Kovilpatti	1,30,000
12.	Scheme for Improvement of Sunflower in Tamil Nadu, Kovilpatti	1,89,000
13.	Scheme for Improvement of Wetland Pulses, Aduthurai	1,31,000
14.	Scheme for Coordinated Agronomic Experiment on Sugarcane, Villupuram	2,59,000
15.	Scheme for Coordinated Agronomic Experiment on Sugarcane, Trichy	3,20,000
16.	Scheme for Research on Nematode Parasites of Sugarcane, Cuddalore	1,53,000
17.	Scheme for Biological Testing of Pesticides Laboratory, Vamban	10,000
18	Scheme for Biological Testing of Pesticides Laboratory, Kovilpatti	71,000
19.	Scheme for Biological Testing of Pesticides Laboratory, Aduthurai	47,000
20.	Scheme for Biological Testing of Pesticides Laboratory, Tindivanam	38,000

University Research Schemes - Plan

1.	Scheme for Breeder Seed Increase, Bhavanisagar	2,35,200
2.	Scheme for Studies on Standardisation of Seed Production and Seed Storage Techniques in Tropical Vegetables, Bhavanisagar	89,700
3.	Regional Research Station, Aruppukottai	4,60,600
4.	National Pulses Research Centre, Pudukkottai	3,25,400
5.	Scheme for Research on Heterosis Breeding in Vegetable Crops, Coimbatore	43,700
6.	Scheme for Strengthening of Coordinated Rice Entomological Research, Coimbatore	1,65,000
7.	Scheme for Strengthening of Coordinated Rice Entomological Research, Madurai	1,22,900
8.	Scheme for Establishment of Plant Clinic Centre, Vellore	98,700
9.	Scheme for Establishment of Plant Clinic Centre, Tirunelveli	83,700
10.	Scheme for Establishment of Plant Clinic Centre, Tirur	74,700
11.	Scheme for Establishment of Plant Clinic Centre, Salem	1,06,000
12.	Scheme for Establishment of Plant Clinic Centre, Srivilliputhur	72,100
13.	Scheme for Development of Sugarcane Varieties Suitable for Southern Districts of Tamil Nadu, Madurai	1,44,600
14.	Scheme for Techno - Economic Survey of Different Districts of Tamil Nadu, Coimbatore	2,41,800
15.	Scheme for the Development of Rice Varieties Suitable for Periyar-Vaigai River Project Area, Madurai	1,83,500
16.	Scheme for Research on Temperate Vegetables, Sandynallah	65,400
17.	Scheme for Research on Temperate Vegetables, Kodaikanal	36,700
18.	Scheme for Research on Temperate Vegetables, Thadiyankudisai	28,800
19.	Scheme for Establishment of Regional Laboratory, Trichy	1,17,300
20.	Scheme for Establishment of Regional Laboratory, Paiyur	1,26,700
21.	Banana Research Station, Vellore	2,50,900
22	Scheme for Strengthening and Coordinating Rice Diseases, Coimbatore	57,700
23	Scheme for Strengthening and Coordinating Rice Diseases, Madurai	1,23,900
24.	Scheme for Research on Bunchy Top Virus Disease, Thadiyankudisai	59,900
25.	Scheme for Research on Improvement of Chillies in the Southern Districts of Tamil Nadu, Paramakudi	1,56,500
26.	Scheme for Research on Potato Virus Diseases, Sandynallah	Kept in abeyance.

27.	Scheme for Establishment of a Horticultural Complex, Kattupakkam	1,21,900
28.	Scheme for Research on the Improvement of Cultivation of Palmyrah Palm, Srivilliputhur	2,30,000
29.	Turmeric Research Scheme, Bhavanisagar	1,15,700
30.	Scheme for Development of Crop Pattern for Different Agro-Climatic Zones, Coimbatore	1,16,000
31.	Scheme for Development of Crop Pattern for Different Agro-climatic Zones, Vellore	1,72,600
32.	Scheme for Development of Crop Pattern for Different Agro-Climatic Zones, Tirunelveli	92,400
33.	Scheme for Development of Crop Pattern for Different Agro-climatic Zones, Paiyur	73,500
34.	Scheme for Development of Crop Pattern for Different Agro-Climatic Zones, Pattukkottai	59,700
35.	Scheme for Development of Seed Technology Unit, Madurai	1,17,800
36.	Krishi Vigyan Kendra, Coimbatore	3,89,700
37.	Krishi Vigyan Kendra, Madurai	3,58,900
38.	Scheme for the Hybrid Development by Mass Production of Haploid and Homozygous Plants in Hybrid Rice and Sorghum by Anther and Pollen Culture, Coimbatore	61,700
39.	Scheme for the Intensification of Research on Medium Staple Cotton, Srivilliputhur	61,600
40.	Scheme for the Intensification of Research on Medium Staple Cotton, Aduthurai	45,600
41.	Scheme for the Intensification of Research on Medium Staple Cotton, Paiyur	57,200
42.	Scheme for the Intensification of Research on Medium Staple Cotton, Kovilpatti	65,900
43	Scheme for M. Sc. Course in Plant Nematology, Coimbatore	17,200
44.	Scheme for Establishment of a centre for Sericulture, Coimbatore	1,48,000
45.	Scheme for Starting of Post-graduate Diploma in Plant Protection. Coimbatore	2,14,800
46.	Strengthening of Research Stations under National Agricultural Research Project, Coimbatore	1,00,000
47.	Scheme for Evolution of High Yielding Crop Varieties Suitable for Lower Bhavani Project Area, Bhavanisagar	64,400
48.	Scheme for Starting of Post-graduate Diploma in Horticulture (Plantation Crops), Thadiyankudisai	65,900
49.	Scheme for Strengthening Research on Chemistry of Submerged Soils of Thanjavur District, Aduthurai	58,300

50.	Scheme for Establishment of Regional Laboratory, Yercaud	96,900
51.	Scheme for Research on Introduction of New Tree Species in Tamil Nadu, Coimbatore	22,500
52.	Scheme for Research on Introduction of New Tree Species in Tamil Nadu, Pudukkottai	22,600
53.	Scheme for Research on Introduction of New Tree Species, Tirunelveli	6,900
54.	Scheme for Research on Introduction of New Tree Species in Tamil Nadu, Mettupalayam	60,300
55.	Scheme for Vegetable Seed Production, Palur	1,16,000
56.	Scheme for Popularisation of Agricultural Implements through Krishi Vigyan Kendra, Coimbatore	46,700
57.	Scheme for Popularisation of Agricultural Implements through Krishi Vigyan Kendra, Madurai	41,200
58.	Scheme for Evolution of Medium Staple Cotton Suitable for Black Soil Rainfed Tracts of Southern Districts, Kovilpatti	62,500
59.	Scheme for Evolution of Forage Crops Suited to the Milk Shed Areas of North-eastern Districts of Tamil Nadu, Vellore	59,000
60.	Scheme for Improvement of Minor Pulses and Synthesising Hybrid Varieties of Sesamum, Coimbatore	1,33,400
61.	Scheme for Establishment of Rural Observatory, Coimbatore	62,300
62.	Scheme for Seed Production and Seed Storage Studies in Sub-tropical and Temperate Crops, Periyakulam	95,100
63.	Scheme for Improvement of Groundnut Suitable for Rainfed Area, Tindivanam	74,700
64.	Scheme for Genetic Improvement of Honeybee, Yercaud	62,000
65.	Scheme for Integrated Weed Management in Different Cropping Systems, Vridhachalam	29,000
66.	Scheme for Integrated Weed Management in Different Cropping Systems, Kovilpatti	17,100
67.	Scheme for Integrated Weed Management in Different Cropping Systems, Aduthurai	39,400
68.	Scheme for Strengthening of Post-graduate Teaching and Research in Agrl. Marketing Management, Coimbatore	82,500
69.	Scheme for Improvement of Forage Grasses, Legumes and Pasture Development, Aruppukottai	33,300
70.	Scheme for Improvement of Forage Grasses, Legumes and Pasture Development, Paiyur	29,000
71.	Scheme for Improvement of Forage Grasses, Legumes and Pasture Development, Erode	37,300

72.	Scheme for Research on Oil Bearing Tree Crops Like Neem, Pungam and Silvagronomical Studies on Energy Fuel Yielding Wood Lots, Aruppukottai	45,800
73.	Scheme for Research on Oil Bearing Tree Crops Like Neem, Pungam and Silvagronomical Studies on Energy Fuel Yielding Wood Lots, Mettupalayam	15,000
74.	Improvement of Existing Downy Mildew Resistant Varieties (Maize) for Yield and Resistability to Rainfed Farming System of Tamil Nadu, Coimbatore	77,200
75.	Scheme for Formulation of Improved Agro-techniques in Grapes Suitable for Dharmapuri District, Paiyur	85,700
76.	Establishment of a Centre for Nematode Pests of Crop Plants, Madurai	87,600
77.	Scheme for the Improvement of Brinjal Varieties for North - eastern Region of Tamil Nadu, Palur	75,400
78.	Studies on the Causes of Low Soil Fertility in Chingleput District, Tirur	65,500
79.	Establishment of a Seed Complex Including Seed Health Testing Training Centre, Bhavanisagar	86,600
80.	Scheme for Agro-processing of Millet Based Food Products at Village Level, Coimbatore	35,900
81.	Scheme for Strengthening of Seed Production Programme at Multi-Crop Experiment Station, Pattukottai	17,900
82.	Scheme for Starting of Bio-fertilizer Production and Quality Control Unit, Coimbatore	51,200
83.	Scheme for Starting of Bio-fertilizer Production and Quality Control Unit, Madurai	60,800
84.	Scheme for Research and Development of Forage Crops, Coimbatore	85,700
85.	Scheme to Evaluate Soil Crusting and Hardening Problems in Tamil Nadu and Evolve Suitable Economic Soil Management Practices, Pudukkottai	68,200
86.	Scheme for Intensification of Research on Soybean Cultivation in Tamil Nadu, Paiyur	38,300
87.	Scheme for Strengthening of Coconut Research in Thanjavur District, Veppankulam	1,44,400
88.	Scheme for Establishment of Advanced Centre for Soil and Crop Management Studies, Coimbatore	1,19,300
89.	Scheme for Establishment of Advanced Centre for Plant Protection Studies, Coimbatore	1,86,300

90.	Scheme for Strengthening of the Training Division in the Directorate of Extension Education, Coimbatore	25,800
91.	Scheme for Research on Improvement of Coriander and Vegetables, Aruppukottai	26,700
92	Scheme for Socio-economic Studies on Tribal Welfare in the Lower Palani Hills, Thadiyankudisai	13,000
93.	Scheme for Studies on the Production Physiology on Rice, Madurai	65,000
94.	Scheme for Establishment of Wetland Banana Research Station, Sirugamani	43,300
95.	Scheme for Establishment of Agricultural Research Station, Vellore	2,18,900
96.	Scheme for Strengthening Estate Office, Coimbatore	2,71,000
97.	Scheme for Studies on Materials and Methods of Farm Structures, Coimbatore	48,500
98.	Up-gradation of TRRI, Aduthurai and also Reorganisation of the Directorate of Research (Agri) Coimbatore	1,85,500
99.	Agricultural College, Killikulam	28,75,000
100.	Scheme for Biological Control of Crop Pests, Coimbatore	41,000
101.	Strengthening of Breeder Seed Programme, Vridhachalam	1,04,000
102.	Strengthening of Breeder Seed Programme, Tindivanam	84,600
103.	Strengthening of Breeder Seed Programme, Kattupakkam	36,000
104.	Scheme for Commercial Exploitation of Heterosis in Rice, Aduthurai	57,400
105.	Strengthening of Radiation Research Centre for Soil and Crop Management Studies, Coimbatore	74,300
106.	Scheme for Studies on Epidemiology and Integrated Management of Rice Plant Diseases, Coimbatore	52,000
107.	Strengthening of National Agrl. Research Project, Paiyur	2,27,000
108.	Strengthening of National Agrl. Research Project, Vridhachalam	43,900
109.	Strengthening of National Agrl. Research Project, Aduthurai	4,97,900
110.	Strengthening of National Agrl. Research Project, Trichy	5,00,900
111.	Strengthening of National Agrl. Research Project, Coimbatore	2,21,500
112.	Scheme for Studies on Wilt and Button Shedding in Coconut, Nagercoil	1,09,900
113.	Scheme for Development of Breeders Seed of Millets, Kovilpatti	1,11,800
114	Scheme for Development of Breeders Seed of Millets, Pudukkottai	74,600
115.	Establishment of Nematology Lab, Tirur	1,81,100
116.	Establishment of Nematology Lab, Trichy	2,09,000
117.	Establishment of Biological Testing Lab, Paiyur	1,18,000
118.	Scheme for Production of Breeders Seed in Paddy, Aduthurai	84,900

119.	Scheme for Improvement of Manjamakkattai and Thalaivirichan Cholam, Vamban	59,000
120.	Scheme for Upgrading the Sugarcane Experiment Station, Cuddalore	2,07,000
121.	Scheme for Strengthening of Multi-crop Experiment Station, Pudukkottai	83,000
122.	Scheme for Multiplication and Distribution of Pulses, Pudukkottai	1,61,600
123.	Scheme for Multiplication and Distribution of Pulses, Coimbatore	53,800
124.	Scheme for Multiplication and Distribution of Pulses, Tindivanam	63,700
125.	Western Ghat Development Programme, Kodaikanal	3,00,000
126.	Strengthening of NARP at School of Genetics, Coimbatore	1,72,800
127.	Strengthening of NARP, Cuddalore	6,800
128.	Strengthening of NARP, Kattupakkam	3,000
129.	Establishment of Water Technology Centre, Coimbatore	1,00,000
130.	Strengthening of NARP, Tindivanam	16,100
131.	Scheme for Biological Control of Crop Pests, Coimbatore	41,000
132.	Scheme for Intensification of Research on Soybean Cultivation in Tamil Nadu, Aduthurai	43,500

ICAR Schemes (Agriculture) - Fully Financed

1.	Scheme for Operational Research Project on Integrated energy and Nutrient supply Systems, Coimbatore	3,67,100
2.	Krishi Vigyan Kendra, Trichy	2,14,100
3.	Krishi Vigyan Kendra, Pondicherry	6,35,300
4.	All India Coordinated Rice Improvement Project, Pondicherry	1,37,700
5.	Scheme for Nutritional Grey Mullet, Tuticorin	38,800
6.	Scheme for Production of Super Elite and Elite Sunflower Seed, Bhavanisagar	4,57,800
7.	Emeritus Scientist, National Pulses Research Centre, Vamban	16,100
8.	Development of Hybrid Rice, Coimbatore	49,400
9.	Scheme for Control of Tomato Diseases by Anti-virus Principles from Non-Hosts, Coimbatore	17,400
10.	Scheme for Un-utilized Winged Beans, Coimbatore	22,900
11.	Scheme on Role of Frogs and Toads in the Biological Control of Insects, Aduthurai	42,400
12.	Scheme for Studies on Biological Effect of Chitin Inhibitor on *Spodoptera litura* and *Heliothis armigera*, Coimbatore	30,400
13.	Scheme for studies on Management of Pulses Pests, *Heliothis armigera* and *Spedoptera litura*, Coimbatore	30,400

58.	Summer Institute on Manipulation of Fertility System, Coimbatore	42,000
59	Scheme for Man Rearing of Parasite *Platygaster sp* and Its Utility in Rice Gallmidge Management, Madurai	46,200
60.	Lab - to - Land Programme, Krishi Vigyan Kendra, Kattupakkam	29,500
61.	Capital Requirement and Modernization of Indian Agriculture, Coimbatore	4,81,000

ICAR Schemes (Agriculture) - Partly Financed

1.	Integrated Scheme for Water Management and Soil Salinity, Bhavanisagar.	3,90,000
2.	All India Coordinated Agronomic Research Project - Cropping System Research, Coimbatore	3,41,000
3.	All India Coordinated Agronomic Research Project - Cropping System Research, Bhavanisagar.	
4.	Integrated Scheme for Water Management and Soil Salinity, Madurai.	4,31,800
5.	All India Co-ordinated Research Project for the Improvement of Wheat, Coimbatore.	61,500
6.	All India Coordinated Research Project for Dryland Agriculture, Kovilpatti.	4,80,000
7.	All India Coordinated Research Project on Soil Test with Crop Response, Coimbatore.	2,68,500
8.	All India Coordinated Research Project on Sugarcane, Cuddalore	59,500
9.	All India Coordinated Research Project on Experiment on Cultivators' Field, Tirur.	2,15,600
10.	All India Coordinated Research Project on Experiment on Cultivators' Field, Pudukkottai.	1,88,400
11.	All India Coordinated Research Project on Experiment on Cultivators' Field, Bhavanisagar.	1,88,200
12.	All India Coordinated Research Project on Experiment on Cultivators' Field, Thanjavur.	1,30,200
13.	All India Coordinated Research Project on Oilseeds, Coimbatore	11,14,800
14.	All India Coordinated Research Project on Oilseeds - Off Season Nursery Project, Aliyarnagar.	2,70,300
15.	All India Coordinated Research Project on Oilseeds - Main Centre for Groundnut, Vridhachalam	4,14,600
16	All India Coordinated Research Project on Oilseeds - Sub centre for Castor Research, Tindivanam.	1,09,800
17.	All India Coordinated Rice Improvent Project, Coimbatore.	2,45,000
18.	All India Coordinated Rice Improvement Project, Aduthurai.	2,97,9 0
19.	All India Coordinated Rice Improvement Project, Madurai.	37,500

20.	All India Coordinated Research Project for Improvement of Millets, Coimbatore	1,73,100
21.	All India Coordinated Research Project for Improvement of Sorghum, Coimbatore	3,32,000
22.	All India Coordinated Research Project on Jute and Allied Fibres, Coimbatore	82,200
23.	All India Coordinated Cotton Improvement Project, Coimbatore	4,77,000
24.	All India Coordinated Cotton Improvement Project, Kovilpatti	1,50,400
25.	All India Coordinated Cotton Improvement Project, Srivilliputhur	2,37,200
26.	All India Coordinated Research Project for Intensification of Research on Improvement of Pulses, Coimbatore	4,11,800
27.	All India Coordinated Research Project for Intensification of Research on Improvement of Pulses, Vamban	4,11,800
28.	All India Coordinated Research Project on Soybean, Coimbatore	77,500
29.	All India Coordinated Research Project on Forage Crops, Coimbatore	1,89,500
30.	All India Coordinated Research Project on Nematode Pests and Their Control, Coimbatore	2,05,800
31.	All India Coordinated Research Project on Pesticides Residues, Coimbatore	2,77,500
32.	Scheme on Coordinated Research Project on Biological Nitrogen Fixation, Coimbatore	1,13,200
33.	All India Coordinated Research Project on Seed Borne Diseases, Coimbatore	65,100
34.	All India Coordinated Research Project on Tuber Crops (Other than Potato), Coimbatore	1,21,000
35.	All India Coordinated Vegetable Improvement Project (Including Chillies), Coimbatore	77,000
36.	All India Coordinated Vegetable Improvement Project (Including Chillies), Kovilpatti	65,700
37.	All India Coordinated Fruit Improvement Project, Coimbatore	4,40,000
38.	All India Coordinated Improvement Project for Medicinal and Aromatic Plants, Kodaikanal	2,52,600
39.	All India Coordinated Spices and Cashewnut Improvement Project, Coimbatore	1,38,000
40.	All India Coordinated Spices and Cashewnut Improvement Project, Vridhachalam	2,13,000
41.	All India Coordinated Coconut and Arecanut Improvement Project, Veppankulam	3,36,000
42.	All India Coordinated Coconut and Arecanut Improvement Project, Coimbatore	41,000

43.	All India Coordinated Fruit Improvement Project, Periyakulam	2,54,000
44.	All India Coordinated Floriculture Improvement Project, Coimbatore	1,72,000
45.	All India Coordinated Fruit Improvement Project, Aruppukottai	1,88,000
46.	Scheme for Research on Cardamom, Yercaud	1,07,000
47.	All India Coordinated Research Project on Post-harvest Technology in Horticultural Crops, Periyakulam	1,49,000
48.	All India Coordinated Research Project on Under-utilised and Under-exploited Plants, Mettupalayam	55,400
49.	All India Coordinated Research Project on Agro-forestry, Mettupalayam	1,29,000
50.	All India Coordinated Mushroom Improvement Project, Coimbatore	2,08,400
51.	Scheme for Studies on Harvest and Post-harvest Technology, Coimbatore	4,00,700
52.	Scheme for Energy Requirement in Intensive Agricultural Production, Coimbatore	4,42,200
53.	All India Coordinated Scheme for Research and Development of Farm Implements, Machinery and Production of Prototypes and Their Evaluation Under Different Agro-climatic Conditions, Coimbatore	6,81,800
54.	Scheme for Intensive Testing of Power Tiller, Coimbatore	1,91,000
55.	Scheme for All India Coordinated Research Project on Renewable Energy Sources, Coimbatore	1,76,800
56.	Scheme for All India Co-ordinated Research Project on Long Term Fertilizer, Coimbatore	86,700
57.	All India Coordinated Scheme on Micronutrients of Soil, Coimbatore	5,06,600
58.	All India Coordinated Scheme for Studies on Measurement Evaluation to Increase Agrl. Soil Physical Conditions, Coimbatore	2,07,800

University Plan Schemes · Animal Science

1.	Mecheri sheep Research Station, Pottaneri	2,17,400
2.	Pasture Development Research Project, Pottaneri	94,800
3.	Coordinated Research Project on Fodder Crops, Kattupakkam	61,000
4.	Strengthening of Department of Pharmocology, Madras	1,44,000
5.	Strengthening of Dept. of Obsetetrics and Gynaecology, Madras	51,500
6.	Dept. of Animal Disease Investigation and Control, Madras	3,09,400
7.	Dept. of Clinics, Madras	14,19,700

8.	Making 'Cheiron' as Bi-monthly Journal, Madras	21,000
9.	Establishment of Radio Isotope Laboratory and Trace Mineral Nutrition, Madras	94,500
10.	Poultry Research and Development Centre, Namakkal	1,87,200
11.	Farmers' Training Centre, Kattupakkam	1,65,500
12	Establishment of Quality Control and Service Division of Animal Feeds, Madras	1,70,200
13.	Poultry Research and Development Centre, Madurai	1,50,200
14.	Poultry Research and Development Centre, Rajapalayam	1,65,900
15.	Poultry Research and Development Centre, Trichy	1,83,100
16.	Livestock Research and Development Centre, Tirunelveli	1,96,800
17.	Livestock Research and Development Centre, Erode	1,86,500
18.	Livestock Research and Development Centre, Dharmapuri	2,00,700
19.	Strengthening Bio-chemistry Section in Dept. of Physiology, Madras	48,900
20.	Strengthening Dept. of Therapeutics, Madras	1,26,900
21.	Livestock Research and Development Centre, Nagercoil	2,21,300
22.	Poultry Research and Development Centre, Tiruppur	1,80,600
23.	Poultry Research and Development Centre, Vellore	2,03,900
24.	Research on Tropical Bovine Theileriasis, Dept. of Parasitology, Madras	1,19,800
25.	Scheme on Influence of Aflatoxicosis on the Immune Response of Cattle Protected Against Rinderpest, Madras	1,25,500
26.	Directorate of Animal Health, Trichy	3,01,300
27.	Establishment of Poultry Production Training Centre, Madurai	94,500
28.	Establishment of Entomology Research Unit, Madras	73,900
29.	Poultry Research and Development Centre, Pudukkottai	1,64,000
30.	Scheme for Enrichment of Poor Quality Cellulosic Waste and Pelleting for Maintenance of Work Bullocks and Cows Yielding Less Than Five Litres of Milk, Kattupakkam	74,300
31.	Control of Abortion in Cattle, Erode	86,900
32.	Control of Abortion in Cattle, Coimbatore	69,500
33.	Strengthening Dept. of Animal Husbandry, Madurai	43,700
34.	Establishment of Institute of Animal Nutrition Kattupakkam	2,27,800
35.	Scheme for Research on Electron Microscopial and Ultrastructural Studies on Rhinosporidiasis, Madras	2,38,500
36.	Strengthening of Dept. of Pathology, Madras	65,000
37.	Strengthening of Dept. of Preventive Medicine, Madras	1,49,000

38.	Scheme for Evolving Broiler Rabbit, Sandynallah	66,000
39.	Scheme for Conducting Short Term Training Course in Meats, Madras	1,75,100
40.	Scheme for Organisation of Dairy Plant in the Dept. of Dairy Science, Madras	4,17,500
41.	Scheme for Karyology of Cattle and Buffalo Chromosomes, Madras	73,200
42.	Establishment of Vaccine Research Centre, Madras	2,73,700
43.	Scheme for Studies on Tropical Bovine Theileriasis (Acarology), Madras	1,00,700
44.	Establishment of Regional Sheep Research Station, Aruppukottai	67,400
45.	Strengthening Dept. of Veterinary Physiology, Madras	59,000
46.	Establishment of Livestock Research and Development Centre, Thanjavur	79,400
47.	Scheme for Starting M. V. Sc in Dairy Technology, Dairy Microbiology and Dairy Chemistry, Madras	1,04,200
48.	Establishment of a Separate Unit for Research on Protozoology and Helminthology, Madras	50,600
49.	Strengthening of Radiology Section, Madras Veterinary College, Madras	76,300
50.	Establishment of a Unit for Histology and Histo-chemistry, Madras Veterinary College, Madras	74,100
51.	Strengthening Animal Husbandry statistics, Madras	50,400
52.	Veterinary College, Madras	11,22,900
53.	Scheme for Studies on Rumen physiology, Madras	61,100
54.	Scheme to Increase the Conception Rate in Frozen Semen Technique, Madras	50,000
55.	Strengthening of Communication Centre, Madras	68,200
56.	Hill Area Development Programme - Strengthening of Sheep Breeding Research Station, Sandynallah	2,00,000
57.	Livestock Research Station, Kattupakkam	33,14,800
58.	Farmers' Training Centre, Pudukkottai	2,36,200

ICAR Schemes (Animal Science) - Fully Financed

1.	All India Coordinated Scheme for Strengthening Agricultural Research Programmes for the Socio-economic Upliftment of Tribals Area - Research for Buffalo Based Farming in Sandynallah	2,35,000
2.	Scheme for Research on Utilisation of Ram semen, Sandynallah	74,700

3.	Scheme for Surveillance of *Salmonella* and *E. coli* Infections of Poultry and Livestock including Pet Animals and Study of Contamination by *Salmonella* of Animal Feeds and Other Products Meant for Export and Local Consumption, Department of Microbiology, Veterinary College, Madras	51,400
4.	Scheme for Evolving Synthetic Eggline, Madras	1,63,000
5.	Scheme for Studies on Bio-chemical Polymorphism in Poultry, Madras	1,17,600
6.	Scheme for Variant Light and Dark Periods on Poultry Production, Madras	64,800
7.	Scheme on Mineral Status of Plant and Animal and Its Relation to the Incidence of Haematuria in Hill Cattle, Sandynallah	68,700
8.	Scheme for Evolving Broiler Rabbits, Sandynallah	1,46,600
9.	Scheme for Establishment of a New Wing of Research and Teaching in Veterinary Public Health and Epidemiology, Madras	1,46,600
10.	Scheme for Internship in Veterinary Science, Madras	3,79,000
11.	Scheme for Processing of Animal Wastes for Production of Sports Guts and Livestock Feed Supplement, Madras	1,74,600
12.	Productive Efficiency of Khaki Campbell, Desi and Their Crosses for Egg Production, Teynampet, Madras	5,01,180
13.	Summer Institute - Recent Advances in Anaesthetic & Surgical Techniques, Madras	42,000
14.	Scheme for Evolving a Synthetic Mutton Breed of Sheep for Tamil Nadu, Pottaneri	85,500

ICAR Schemes (Animal Science) - Partly Financed

1.	All India Coordinated Research Project on Poultry for Meat, Teynampet, Madras	8,33,100
2.	All India Coordinated Research Project on Sheep Breeding for Fine Wool, Sandynallah	7,30,000
3.	All India Coordinated Research Project on Sheep Breeding Field Demonstration Unit, Sandynallah	57,500
4.	All India Coordinated Research Project on Sheep for Mutton, Kattupakkam	5,40,000

Fisheries - Plan

1.	Scheme for Culture of Brime Shrimp, *Artemia salina*, Department of Fishery Biology, Tuticorin	50,600
2.	Scheme for Pollution Monitoring Studies in Tuticorin Waters	39,700
3.	Scheme for Mariculture of Fishes, Fisheries College, Tuticorin	30,000

4.	Scheme for Brackish Water Pen Culture, Tuticorin	36,000
5.	Scheme for ORP on Fish Culture, Killikulam	46,400
6.	Scheme for ORP on Fish Culture, TRRI, Aduthurai	34,500
7.	Starting of M. F. Sc. Course, Fisheries College, Tuticorin	97,300
8.	Scheme for Polyculture of Fin Fishes and Shell Fishes in Brackish Water, Tuticorin	95,400
9.	Scheme on Nutrient Chemistry and Proper Utility of Sewages, Tuticorin	40,000
10.	Scheme for Preparation of Certain Smoke Cured Fishes, Tuticorin	40,000

Government of India Schemes

1.	Comprehensive Scheme for Studying the Cost of Cultivation of Principal Crops, Coimbatore	14,13,000
2.	Establishment of Bio-energy Centre, Coimbatore	1,96,900
3.	Establishment of Regional Centre for Development of Biogas, Coimbatore	1,09,800
4.	National Project on Development and Use of Fertilizer, Coimbatore	10,000
5.	Scheme for Developing Forage Grasses, Forage Legumes and Forage Trees for Hill Areas of Palani Hills of Western Ghat, Perumbarai	1,12,000
6.	Scheme for Exploitation of Microbial System Associated with Plant Species in the Eco-Development of Western Ghat Region, Kodaikanal	53,100
7.	Scheme for Exploitation of Microbial System Associated with Plant Species in the Eco-Development of Western Ghat Region, Sandynallah	34,300
8.	Scheme for Exploitation of Microbial System Associated with Plant Species in the Eco-Development of Western Ghat Region, Mettupalayam	45,100
9.	Scheme for Research on Medicinal Plants and Tropical Pines, Kodaikanal	4,44,000
10.	Scheme for Research on Medicinal Plants and Tropical Pines, Sandynallah	1,38,900
11.	Scheme for Nutrient Potential Studies of Soils of Western Ghats and Environmental Pollution of Soils, Plants and River Water Basins, Kodaikanal	1'92,500
12.	Scheme for Impact of Industrial Pollution of the Ecology of Bhavani River and Environs, Coimbatore	44,800

13.	Scheme for Tribes and Other Communities of Western Ghats - Their Socio - cultural and Psychological Characteristics, Rehabilitation and Development in Relation to Eco-system, Kodaikanal	83,000
14.	Flowering, Seed-set and Seed Quality in Forest, Plantation, Forage and Vegetable Crops as Influenced by the Agro Techniques and Pollutants Affecting the Ecological Balancce, Kodaikanal	48,000
15.	Flowering, Seed-set and Seed Quality in Forest, Plantation, Forage and Vegetable Crops as Influenced by the Agro Techniques and Pollutants Affecting the Ecological Balance, Mettupalayam	52,000
16.	Flowering, Seed-set and Seed Quality in Forest, Plantation, Forage and Vegetable crops as Influenced by the Agro Techniques and Pollutants Affecting the Ecological Balance, Coimbatore	45,500
17.	Scheme for Integrated Eco-Development Project of Western Ghat, Coimbatore	29,000
18.	Scheme for Environmental Education in the Western Ghat Region, Coimbatore	63,200
19.	Scheme for Development of Sugarcane, Melalathur	1,31,300
20	Scheme for Development of Sugarcane, Sirugamani	33,500
21.	Scheme for Development of Sugarcane, Cuddalore	1,07,000
22.	Scheme for Forage Legumes and Forage Trees for Hill Area of Palani Hills, Coimbatore	1,500
23.	Scheme on Survey on Identification of Location Specific Environmental problems in the Nilgiris Range of Western Ghat, Coimbatore	2,000
24.	Scheme for Study on the Effects of Sea Water Intrusion and Inundation on the Soil-Plant Characteristics, Aduthurai	35,000
25.	Scheme for Survival and Effectiveness of Rhizobial Inoculants in Rice Fallow Pulses, Aduthurai	19,900
26.	Scheme on TRYCEM, Coimbatore	2,15,000
27.	Scheme on TRYCEM, KVK, Trichy	29,400
28.	Scheme on TRYCEM, Madurai	18,100
29.	National Project on Biogas, Coimbatore	46,000
30.	Standardisation of Developed Bio-gas Plant Components and Enriched Process Techniques of NDC Output, Coimbatore	1,30,000
31.	Scheme for Evolution of Farm Management at Cauvery Delta, Thanjavur	59,000
32.	Scheme for Establishment of Plasticulture Development in Agriculture, Coimbatore	2,69,900
33.	Scheme on Extent of Concealed Tenancies Assessment in Tamil Nadu, CARDS, Coimbatore	91,900

Other Agencies

1.	Scheme for Training Women in Enterprise Management to Encourage Their Participation, Madurai (Ford Foundation)	85,300
2.	Scheme for Training Women in Enterprise Management to Encourage Their Participation, Tuticorin (Ford Foundation)	1,55,900
3	Scheme for Training Women in Enterprise Management to Encourage Their Participation, Coimbatore (Ford Foundation)	49,300
4.	Scheme for All India Coordinated Research Project on Weed Control, Coimbatore (PL 480)	2,96,100
5.	Scheme for Institution of a Chair in Agricultural Marketing Management, Coimbatore (Tamil Nadu State Agrl. Marketing Board)	77,000
6.	Project on Credit for Rural Development in Southern Tamil Nadu, Madurai (NABARD)	1,75,000
7.	Scheme for Utilization of Coir Pith in Agricultural Farms, Coimbatore (Coir Board)	94,700
8.	Institution of a Professorial Chair of Professor of Agronomy for Undertaking Experiments on Fertilizer Use in Soil and Crop Management Studies, Coimbatore (IFFCO)	57,500
9.	Planning for Rural Future - An Experiment, Coimbatore (Ford Foundation)	2,22,100
10.	Scheme for Self Employment of Rural Women in Agriculture in Production of Bio-control Agents, Coimbatore. (Ford Foundation)	1,24,400
11.	Changing Structure of Rural Employment and Factor Market in Tamil Nadu, Coimbatore (Ford Foundation)	94,200
12.	Institution of a Chair of Professor of Soil Science, Coimbatore (SPIC, Madras)	46,500
13.	Scheme for Fate and Efficiency of Urea Based Fertilizer in India, Coimbatore (PL 480)	1,33,400
14.	Survey on the Production and Utilization of Horsegram, Paiyur, (IDRC).	75,000

APPENDIX-III

LIST OF BOOKS / BOOKLETS PUBLISHED

English

1. A Manual on Inland Aquaculture.
2. Phytoplankton of Indian Seas.
3. Efficient Use of Insecticides.
4. Handbook on Special Lectures by Experts.
5. Booklet on Chalam Memorial Lecture.
6. Banana Breeding.
7. Heterosis in Rice.
8. Soil Resource utilization.

Tamil

1. வேளாண்மைக் கையேடு.
2. நுண்ணுயிர் உரங்கள்.
3. பயிர் நோய்களைக் கட்டுப்படுத்தும் முறைகள்.
4. நடுத்தர இழை நீளப்பருத்திச் சாகுபடித் தொழில் நுட்பங்கள்.
5. விஞ்ஞான முறையில் வெற்றிலைச் சாகுபடி.
6. அலங்கார மீன் வளர்ப்பு.
7. வளர்ப்பு மீன்கள்.
8. காளான் வளர்ப்பு.
9. தென்னையில் திருந்திய சாகுபடி நுணுக்கங்கள்.
10. பண்ணைக் குளங்களில் மீன் வளர்ப்பு.
11. நெல் சாகுபடி.
12. செலவில்லாத சிக்கன சாகுபடி.
13. பண்ணைக்காடுகள்.
14. ஒருங்கிணைந்த பயிர்ப்பாதுகாப்பு.
15. ஒருங்கிணைந்த களை நிர்வாகம்.
16. மீன் வளர்ப்பு.

APPENDIX IV

List of Research Papers Published

AGRICULTURE

Agricultural Biochemistry

1. Chitra, R. and S. Sadasivam, 1986 A study of the trypsin inhibitor of black-gram (*Vigna mungo* (L) Hepper). *Food Chemistry*, 21 : 315-326.

2. Sivaprakasam, K., Theymoli Balasubramanian, S. Sadasivam and N. Shanmugam, 1986. Nutritive value of sporophores of *Calocybe indica*. *Mushroom Newsletter for the Tropics*, 6 (4) : 14-15.

Agricultural Botany

1. Amirthadevarathinam, A., P. Vivekanandan, P. Gomathinayagam, P. Shanmugam and R. Arjunan, 1986. PMK 1, an improved rainfed lowland rice variety for Tamil Nadu. *IRRN*, 11 (4) : 7.

2. Balasubramanian, M., M. Subramanian, R. Marimuthu and V. Sivasubramanian, 1986. Performance of deep water rice varieties in Tamil Nadu. *Deep Water Rice*, 1/86, IRRI, Bangkok, Thailand.

3. Gomathinayagam, P., and G. Soundrapandian, 1987. Root growth studies on some of the upland rice cultures. *Oryza*, 24 : 1.

4. Jebaraj, S., M. S. Venugopal and G. Soundrapandian, 1986. IET 6012 - A promising midge resistant rice culture. *IRRN*, 11 (6) : 8.

5. Krishnadoss, D. and M. Kadambavanasundaram, 1986. Correlation between yield and yield components in Sesame. *J. Oilseeds. Res.*, 3 (2) : 205-209.

6. Krishnadoss, D., M. Kadambavanasundaram, R. Sethupathi Ramalingam and S. Rajasekaran, 1987. Combining ability in sesamum. *Indian J. Agri. Sci.*, 57 (2) : 85-88.

7. Kandasamy, G., S. Rajasekaran and M. Kadambavanasundaram, 1985. Studies on stability for yield component characters and correlation of stability parameters in cowpea. (*Vigna unguiculata* (L) Walp). *Madras Agric. J.*, 72 (1) : 9-15.

8 Lakshmanan, P., S. Palanisamy and R. Jeyarajan, 1987. Sources of multiple resistance to major diseases of sorghum in Tamil Nadu, India. *Tropical Pest Management*.

9. Lakshmanan, P., S. Palanisamy and R. Jeyarajan, 1986. Identification of some sources of resistance to sugary diseases of sorghum in Tamil Nadu, India. *Bulletin of Pure and Applied Sciences*, (2) : 1-2.

10 Manimekalai, G. and S.R. Sree Rangaswamy, 1987. Anther culture and somatic embryogenesis in rice hybrids. (Second Annual conference of the International Plant Biotechnology Network Abstract).

11. Manoharan, V., P. Vindhiyavarman, N. Sundaram and S. Thangavelu, 1985. An analysis of combining ability in groundnut *Madras Agric. J.*, 72 : 601-605.

12. Manuel, W. W., S. Vairavan, K. Ganesan, T. Sundaram, S. Palanisamy and M. Subramanian, 1986. ASD 16, a new short duration rice variety for Tamil Nadu. *IRRN*, 11 (4) : 3.

13. Mohamed Sheriff, N., R. Appadurai and M. Rangasamy, 1985. Heterosis in varietal crosses of sunflower. *Madras Agric. J.*, 72 : 6-8.

14. Mohamed Sheriff, N., and R. Appadurai, 1985. Genetic variability of some quantitative traits in sunflower. *Madras Agric. J.*, 72 : 539-40.

15. Mohamed Sheriff, N., R. Appadurai and S. R. Sree Rangaswamy, 1987. Correlation and path-analysis in sunflower. *Indian J. Agric. Sci.*, 57 : 125-27.

16. Natarajamoorthy, K., G. A. Palanisamy and S. Palanisamy, 1987. Extent of wind induced tip drying in popular rice varieties in Coimbatore. *IRRN*, 12 (1) : 11-12.

17. Nallathambi, G., T.S. Raveendran, T. Ramanathan and H. Vijayaraghavan, 1986. Exploitation of heterosis for oil content in coconut. *Indian coconut J.*, 17 : (4) 3-4.

18. Palanisamy, S., P. Manivasakam, AR., Muthiah and K Mohanasundaram, 1986. Association analysis for dry matter production and distribution in sorghum. *Madras Agric. J.*, 73.

19. Paramasivam, K.S., 1985. A note on the performance of medium duration rice varieties in *Kharif* season. *Madras Agric. J.*, 72 (6).

20. Paramasivam, K. S., 1985. Study on heterotic potential in crosses involving leaf folder *(Cnaphalocrosis medinalis* (Gr) resistant rice accessions. *Madras Agric. J.*, 72 (12).

21. Rajagopal, S. and S. Palanisamy, 1986. Nursery management for short duration rice. *Oryza*, 23 (3).

22. Rajagopal, S. and S. Palanisamy, 1986. A suitable cropping system for Thambiraparani region in Tamil Nadu. *IRRN*, 11 (5) : 43-44.

23. Rajagopal, S. and M. Subramanian. Response of rice to different N fertilizers. *IRRN*, 11 (5) : 39-40.

24. Rathinaswamy, R., N. Sundaram, P. Vindhiyavarman, M. Muthusamy, R Sethupathi Ramalingam and M. Vaman Bhat, 1986. Groundnut lines resistant to late leaf spot and rust developed through hybridization of 'Mutant 1', *Arachis hypogaea* (L) with *A. villosa* Benth. *Indian J. Agric. Sci.*, 56 : 537-539.

25. Ramalingam, A., and S. R. Sree Rangaswamy, 1987. Genetic analysis of sugar content and its components in sorghum. *Indian J. Agric., Sci.*, 57 (5) : 289-93.

26. Rangasamy, M., K. Natarajamoorthy and G. A. Palanisamy, 1987. Isolation of restorers and maintainers for two Chinese male sterile lines having wild abortive cytoplasm. *IRRN*, 12 (1) : 13.

27. Raveendran, T. S., 1986. Combining ability in pearl millet. *Indian J. Agric., Sci.*, 56 : 549-552.

28. Selvi, B., and S. Palanisamy, 1987. Heterosis for stem sugar and related characters in sorghum. *Indian J. Agric. Sci.*, 57 (6) : 423-24.

29. Sivasubramanian, V., 1986. Hybrid rice-China can do it. Why not India. [Rice farming souvenir of Govt. of India, 1986].

30. Sree Rangaswamy, S. R., T. B. Ranganathan and G. Manimekalai Gurunathan, 1987. Variability in quantitative traits in anther culture derived progenies. *IRRN*, 12 (1) : 15-16.

31. Subramanian, M., and V. Sivasubramanian, 1986. Comparison of rice hybrids and local varieties at TRRI. *IRRN*, 11 (4) : 21.

32. Subramanian, M., APM. Kirubaharan Sundararaj and V. Sivasubramanian, 1986. Performance of new short duration rice varieties at TRRI, Aduthurai. *IRRN*, 11 (4) : 6.

33. Subramanian, M., APM. Kirubaharan Sundararaj and V. Sivasubramanian, 1986. Reaction of IRRI rices to rice diseases in Tamil Nadu. *IRRN*, 11 (1) : 7.

34. Subramanian, M., APM. Kirubaharan Sundararaj and V. Sivasubramanian, 1986. Reaction of TRRI and Tamil Nadu rices to yellowing syndrome. *IRRN*, 11 (1) : 6.

35. Subramanian, M., APM. Kirubaharan Sundararaj and V. Sivasubramanian, 1986 Performance of IR 64 at TRRI. *IRRN*, 11 (1) : 10.

36. Subramanian, M., APM. Kirubaharan Sundararaj and V. Sivasubramanian, 1986. Performance of new rice cultivars at TRRI. *IRRN*, 11 (4) : 4.

37. Subramanian, M., V. Sivasubramanian and S. Chelliah, 1986. Improved White Ponni released in Tamil Nadu. *IRRN*, 11 (5) : 4.

38. Subramanian, M., APM. Kirubaharan Sundararaj and V. Sivasubramanian, 1986. Reaction of short duration rice varieties to leaf yellowing. *IRRN*, 11 (5) : 7.

39. Subramanian, M., V. Sivasubramanian and G. S. Kush, 1987. Performance of medium duration IRRI lines at Tamil Nadu. *IRRN*, 12 (1) : 8-9.

40. Sukanya Subramanian and M. Govindasamy, 1985. Forage production of cereal-legume mixture. *Madras Agric. J.*, 72 (10) : 590-592.

41. Sukanya Subramanian, K. M. Balasubramanian, T. B. Ranganathan, V. Sivasubramanian and J. Chandramohan, 1985. CO 43, a salt tolerant rice variety. *Madras Agric. J.*, 72 (11) : 605-608.

42. Sukanya Subramanian, P. Chandrasekharan and S. R. Sree Rangaswamy, 1986. Fodder cumbu to augment fodder production. *Milcow*, 8 (2) : 33-36.

43. Sundaram, T., W. Wilfred Manuel, and S. Palanisamy, 1986. IR 50, a stable variety for *Kar* in Thambiraparani tract. *IRRN*, 11 (5) : 7.

44. Vindhiyavarman, P., R. Rathnaswamy, R. Sethupathi Ramalingam and M. Vaman Bhat, 1985. Inheritance of cresent colour on standard petal in groundnut. *Madras Agric. J.*, 72 : 394-396.

Agricultural Economics

1. Ajjan, N., 1986. Regulated Markets in Tamil Nadu - A malady remedy analysis. *Agrl. situation in India*, 41 (9) : 455-458.

2. Rajagopalan, V. and C. Ramasamy, 1986. The impact of technological change in agriculture on rural welfare. *Agrl. Situation in India*, 41 (9) : 723-729.

3. Ramasamy, C., M. Chandrasekaran and R. Prabaharan, 1986. Sustaining rapid growth in fertilizer use in rice regions. *Indian Journal of Agrl. Economics*, 41 (4) : 723-729.

4. Sivanantham, M. and S. Varadarajan, 1986. Policies for management of systems tanks. *Indian Journal of Agrl. Economics*, 41 (4) : 536.

5. Subramanian, S. R., 1986. Agricultural development and adoption of family planning. *Journal of Family Welfare*, XXXIII, (2).

6. Sundaresan, R. and M. Chinnadurai, 1986 Survey of Pudukkottai district - Sparse forest cover poses threat. *The Economic Times*, P. 6, 19th August, 1986.

7. Sundaresan, R. and M. Chinnadurai, 1986. Techno - economic survey of South Arcot - Prospect of industrialisation. *The Economic Times*, p. 4, 3rd November, 1986.

8. Sundaresan, R. and M. Chinnadurai, 1986. Inter-industry analysis of Tirunelveli district. *Rural Development Review*, 5 (3 & 4) : 507-515.

Agricultural Entomology

1. Balasubramanian, G., T. Manoharan, K. Natarajan and S. Chelliah, 1985. Chemical control of earhead pests of Sorghum. *Pestology*, 9 (2) : 34-36.

2. Chandramohan, N. and T. Manoharan, 1986. Insecticidal evaluation against groundnut leafminer, *Aproarema modicella*. *Pestology*, 10 (3) : 12-13.

3. Doraisamy, P. and K. Rajukkannu, 1985. Degradation of diuron in soils. *Madras Agric. J.*, 72 (7) : 414-416.

4. Durairaj, C., M. Gopalan and M. S. Venugopal, 1987. Reaction of eight rices to gallmidge. *IRRN*, 12 (1) : 11.

5. Dhandapani, N. and A Abdul Kareem, 1986. Evaluation of poison bait for the red hairy caterpillar, *Amsacta albistriga Wlk*. *Pestology*, 10 (11) : 8-10.

6. Dhandapani, N., A. Abdul Kareem and S. Jayaraj, 1986. Life fecundity tables of *Spodoptera litura* (Fb.) on chilli. *Indian J. Agric. Sci.*, 56 (4) : 290-293.

7. Dhandapani, N., A Abdul Kareem and S. Jayaraj, 1986. Studies on the use of colour cloth to trap cotton leaf worm, *Spodoptera litura* (F) (Nectuidae : Lepidoptera). *Cott. Dev.*, 15 (4) : 11-12.

8. Ethiraju, S., R. J. Rabindra and S. Jayaraj, 1987. NPV difflubensuron and insect combination for the control of *Heliothis armigera* on chickpea. *News. Internal. Heliothis Biol. Control work gr.* 6 : 9.

9. Gunathilagaraj, K and M. Gopalan, 1986. Rice leaf folder complex in Madurai, Tamil Nadu, India. *IRRN*, 11 (6) : 24.

10. Jebaraj, S., G. Soundarapandian and M. S. Venugopal, 1986. IET 6012 (ACM 8), a promising cold tolerant and midge resistant variety. *IRRN*, 11 (5).

11. Joshi, R. C. and M. S. Venugopal, 1984. Mechanism of resistance in rice to gallmidge. *Indian J. Entomology*, 46 : 299-302.

12. Joshi, R. C. and M. S. Venugopal, 1984. Mechanism of resistance in rice to gallmidge, *Orseolia oryzae* (Wood-Mason) I. Antibiosis. *Indian J. Entomology*, 46 (4) : 479-481.

13. Joshi, R. C., E. A. Heinrichs and M. S. Venugopal, 1986. A rice leaf folder *Marasmia patnalis*, escaped attention of rice entomologist. *Pesticides*, 20 (1) : 51.

14. Karuppuchamy, P. and M. Mohanasundaram, 1987. Bio-ecology and control of chilli muranai mite, *Polyphagotar sonemuslatus* (Banks) (Tarsonemidae : Acari)., *Indian J. Plant Prot.*, 15 : 1-4.

15. Karuppuchamy, P. and M. Mohanasundaram, 1987. Three new species and records of Tetranychid mites (Tetranychidae : Acarina) from India. Paper presented in the VII International Congress on Acarology held at Bangalore, India from 3-9, August, 1986, Abstract p. 15.

16. Karuppuchamy, P., R. Velusamy, R. Rajendran and P. C. Sundara Babu, 1987. Rice mite *Oligonychus oryzae* (Hirst) incidence of IR elite lines. *IRRN*, 12 (2) : 20.

17. Logiswaran, G. and M. Mohanasundaram, 1985. Studies on the relationship between light trap catches and field incidence of groundnut leaf miner, *Aproaerema modicella* (Galechiidae : Lepidoptera). *Madras Agric. J.*, 72 (11): 629-632.

18. Logiswaran, G. and M. Mohanasundaram, 1985. Effect of intercropping, spacing and mulching in the control of groundnut leaf miner, *Aproaerema modicella* Deventer (Galechiidae : Lepidoptera). *Madras Agri. J.*, 72 (12) : 695-700.

19. Mahadevan, N. R. and M. Mohanasundaram, 1986. Field evaluation of insecticides for their efficacy in the control of sesame leaf webber and gall midge. *Oil Crops Newsletter*, 3 : 47-48.

20. Mahadevan, N. R. and S. Chelliah, 1986. Influence of season and weather factors on the occurrence of the sorghum stem borer, *Chilo partellus* (Swinhoe) in Tamil Nadu. *Tropical Pest Management*, 32 : 212-214.

21. Mahadevan, N. R. and S. Chelliah, 1986. Influence of intercropping legumes with sorghum on the infestation of the stem borer, *Chilo partellus* (Swinhoe) in Tamil Nadu, India. *Tropical Pest Management*, 32 : 162-163.

22. Manoharan, T. and N. Chandramohan, 1986. Entomophagous nematode infection of leaf folder. *IRRN*, 11 : 3 (24).

23. Mohanasundaram, M., 1985. Three new species of Eriophyid mites with a record of occurrence of *Notostrix attenuata* (Acari : Eriophyidae) from South India. *Indian J. Acar.*, 9 : 23-28.

24. Mohanasundaram, M., 1985. "Gall mites of India - Their economic status", in *Non-Insect Pests and Predators Science* (Writers Association, New Delhi) pp. 29-35.

25. Mohanasundaram, M. and R. M. Sharma, 1985. New species and records of eriophyids (Acari : Eriophyidae) from Andamans. *Indian J. Acar.*, 9 : 17-22.

26. Mohanasundaram, M. and R. M. Sharma, 1985. Two new species of *Aceria* and a record of occurrence of *Aceria leptothrix* (Acari : Eriophyidae) from Andamans. *Indian J., Acar.*, 9 : 11-16.

27. Mohanasundaram, M., P. S. Jagadish, N. Venkatesh and H. R. Ranganath, 1985. New species and records of eriophyid mites (Acari : Eriophyidae) from Karnataka, India. *Indian J. Acar.*, 9 : 1-10.

28. Mohanasundaram, M., 1986. Two new species and a new record of eriophyid mites (Acari : Eriophyidae) from Tamil Nadu, India. *Entomon.*, 11 (4) : 227-230.

29. Mohanasundaram, M., 1986. Three new species of Nothopodinae (Acari : Eriophyidae) from Tamil Nadu. *Entomon.*, 11 (1) : 41-45.

30. Mohanasundaram, M., 1986. New genus and species of gall mites (Acari : Eriophyidae) from Tamil Nadu. *Entomon.*, 11 (2) : 229-233.

31. Mohanasundaram, M., 1986. Three new species of Rhyncaphytoptid mites (Rhyncaphytoptidae : Eriophyidae) from Tamil Nadu. *Entomon.*, 11 (1) : 47-51.

32. Natarajan, K. and S Chelliah, 1986. Chemical control of shootfly and stem borer of sorghum. *Pesticides*, 28 (1) 23-24.

33. Natarajan, K. and S. Chelliah, 1986. Management of sorghum grain midge, *Contarinia sorghicola* coq. using plant resistance and insecticides. *Indian J. Plant Prot.*, 14 (1) 77-79.

34. Natarajan, K. and S. Chelliah, 1986 Studies on the mechanism of resistance in sorghum accessions to the grain midge, *Contarinia sorghicola* coquillet. *Insect Sci. Applic.*, 7 (6) : 751-755.

35. Pasupathy, S. and M. S. Venugopal, 1986. Evaluation of electrodynamic formulations of cypermethrin with electrodyne sprayer in the control of cottor pests. *Indian J. Pl. Prot.*, 14 (1) : 11-19.

36. Rabindra, R. J., S. Jayaraj and M. Balasubramanian, 1986. Efficacy of nuclear polyhedrosis virus for the control of *Heliothis armigera* (Hubber) infesting sunflower. *J. Ent. Res.*, 9, 246-248.

37. Rabindra, R. J. and S. Jayaraj, 1986. "Multiplication and use of nuclear polyhedrosis virus for the control of important crop pests" in S. Jayaraj, (Ed.), *Pest and Disease Management* (TNAU, Coimbatore), 252 pp.

38. Rabindra, R J. and S. Jayaraj, 1986. Efficacy of NPV with adjuvants as high volume and ultra low volume applications against *Heliothis armigera Hbn.* on chickpea and influence of varieties on virus control. *International Heliothis Biological control work group Newsletter*, 5 : 6.

39. Rabindra, R. J. and S. Jayaraj, 1987. Evaluation of some adjuvants for NPV of *Heliothis armigera*. *Interl. Heliothis Biol. control work Gr. Newsletter*, 6: 12.

40. Rabindra, R. J., S. Ethiraju and S. Jayaraj, 1987. Efficacy of tale-based wettable powder and dust formulations of nuclear polyhedrosis virus against *Heliothis armigera*. *Interl. Heliothis biol. control. work. Gr. Newsletter*, 6 : 8.

41. Rajendran, R., B. Rajendran and P. C Sundara Babu, 1986. Varietal resistance of rice to leaf folder *Cnaphalocrocis medinalis*. *Ann. Plant Res. Inst. Newsl.* 12 : 46-47

42. Rajendran, R., B. Rajendran and P. C. Sundara Babu, 1986. Varietal resistance of rice to leaf folder *Cnapalocrocis medinalis*. *IRRN*, 11 (4) : 17.

43. Rajasekaran, B., S. Jayaraj and R. Rajendran, 1986. Studies on the effectiveness of neem products and non-edible vegetable oils against *Spodoptera litura* and *Nilaparvata lugens*. Paper presented in the 3rd Int. Neem Conf. Centre for Insect physiology and Ecology, Nairobi, July 10-15, 1986.

44. Rajasekaran, B., R Rajendran, R. Velusamy and P. C. Sundara Babu, 1987. Effect of vegetable oils on rice leaf folder (LF) feeding behaviour. *IRRN*, 12 (2) : 34.

45. Rajukkannu, K., 1985. Degradation and persistence of Atrazine in soils. *Madras Agric. J.*, 72 (2) : 92-95.

46. Rajukkannu, K., P. Duraisamy and R. Rajendran, 1985. Residues levels of certain insecticides dusts in rice grain and straw. *Madras Agric. J.*, 72 (3) : 141-145.

47. Rajukkannu, K. and P. Duraisamy, 1986. Insecticides residues in rice. *Madras Agric. J.*, 72 (4) : 203-204.

48. Rajukkannu, K., B. Habeebullah, P. Duraisamy and M. Balasubramanian, 1985. Insecticides residues in sorghum - effect of different formulations. *Madras. Agric. J., 72 (5)* : 241-243.

49. Ramakrishnan, C. and P. C. Sundara Babu, 1986. Stemfly and leaf miner reaction in greengram (*Phaseolus aureus*) and resistance in cowpea (*Vigna unguiculata*) to aphid. *Ann. Plant Res. Inst. Newsl.* 12 : 47-48.

50. Regupathy, A., B. Habeebullah, and M. Balasubramanian, 1984. Studies on dissipation of certain insecticides on radish. *Indian J. Ent.*, 46 (2) : 174-78.

51. Saroja, R. 1986. Effect of neem product foliar sprays on rice pests. *IRRN*, 11:4.

52. Sathiyanandam, V. KR., M. S. Venugopal, M. Gopalan and R. Janarthanan, 1986. Laboratory evaluation of insecticides for controlling greenhorned caterpillar. *IRRN*, 11 (3) / 20.

53. Sellammal Murugesan and S. Chelliah, 1986. Yield loss and economic injury by rice leaf folder. *Indian J. Agric. Sci.*, 56 (4) : 282-285.

54. Shanthi, P., B. Rajasekaran, S Jayaraj and G. R. Rao. 1986. Studies on the feeding deterrancy and toxicity of certain plant extracts against insect pests of cotton, castor and chickpea Paper presented in 3rd Int. Neem conf., Centre for Insect Physiology and Ecology, Nairobi, July 10-15, 1986.

55. Sivaprakasam, N., G. Balasubramanian, S. Venkatesan and A. Narayanan, 1985 Life table and Intrinsic rate of increase of *Bracon kirkpatrickii* Wilkinson on *Corcyra cephalonica*. *Ind. J. Agric Sci.*, 55 (2) : 762 - 64.

56. Somasundaram, L. and A. Regupathy, 1986. Persistence toxicity of certain insecticides to *Aphis gossypii* Glov. *Cotton Dev.*, 15 (4) : 35-36

57. Sridharan, S. and R. Janarthanan, 1986. High pressure liquid chromatographic method for etimation of dislodgeable residues of methomyl. *Curr. Sci.*, 55 (20) : 1048.

58. Subramanian, A., S. Murugesan, R. Rajendran and P. C. Sundara Babu, 1986. Occurrence and control of rice beetle bug at Coimbatore. *IRRN*, 11 (3) : 24.

59. Sundara Babu, P. C and S. Jayaraj. 1986. "Entomopathogenic fungi and their utilisation in pest suppression," In M. C. Nair and S. Balakrishnan, (Ed.) Beneficial fungi and their utilisation (M.C Scientific Publishers, Jodhphur) p. 133-156.

60. Sundararaju, D., D. Kalaichelvan and A. V. Rangarajan, 1986. Control of redgram pod borers with insecticidal dust. *Pestology*, 10 (3) : 17-18.

61. Suresh, S. and R. Regupathy, 1986. Toxicity of insecticides to banana aphid, *Pentalonia nigronervoso* Coq. *Indian J. agric. Sci.*, 56 (3) : 200-203.

5. Kandasamy, D., N. V. Radha and G. Oblisami, 1986. Response of different mulberry varieties to the inoculation of VA-mycorrhizal fungi. *Indian J. Seric.*, 25 : 36-39.

6. Kannaiyan, S., 1987. Studies on the nitrogen fixing potential of symbiotic blue green alga - *Anabaena azollae* and its utilization for rice crop. *Abst. Inter. Symp. Phycology*, Univ. Madras. p. 54-55.

7. Kannaiyan, S., 1986. Studies on *Azolla pinnata* for rice crop. *Res. J. Pl. Environ.*, 3 (1) : 1-16.

8. Kannaiyan, S., 1987. Effect of Benlate on the germination of *Azolla mexicana* megasporocarps. *Curr. Sci.*, 56 : 490-491.

9. Kumar, K. and A. Balasubramanian, 1986. Field response of rice to *Azospirillum* biofertilizer. *Curr. Res.*, 15 : 74-76.

10. Palaniappan, SP. and A. Balasubramanian, 1986. Effect of two soil applied pesticides on nitrification in red soil. *Pesticides*, 20 (1) : 34-36.

11. Palaniappan, SP. and A. Balasubramanian, 1985. Influence of two pesticides on certain soil enzymes. *Agric. Res. J. Kerala*, 23 (2) : 189-192.

12. Palaniappan, SP. and A. Balasubramanian, 1986. Effect of two pesticides on Rhizosphere microflora of cowpea. *Pesticides*, 20 (1) : 19-24.

13. Purushothaman, D., 1986. Application of press mud for soil amelioration. *Natl. Acad. Sci. Lett.*, 9 : 257-259.

14. Purushothaman, D., S. Chandramohan and G. Oblisami, 1986. Nitrogenase depressed mutants in *Azospirillum*. *Curr. Sci.*, 55 : 1192-1194.

15. Purushothaman, D., R. Jambulingam and S. Kannaiyan, 1986. Root nodulation in *Acacia holosericea*, An introduced tree species from Australia. *Natl. Acad. Sci. Lett.*, 9 : 129-131.

16. Purushothaman, D., S. Gunasekaran and G. Oblisami, 1987. Response of rice to *Azospirillum* inoculation. *IRRN*, 12 : 80.

17. Rajasekaran, P., R. Murugesan and A. Palanisamy, 1986. Effect of temperature on microbial numbers and biogas production of some anaerobically digested wastes. *Agricultural Wastes*, 17 : 83-90.

18. Rangarajan, M., 1986. "Microbes, man and Ecology". Proceedings of the Training Course on Ecological Agriculture in Developing Countries. (Ed). Erik Van der Werf. (E.T.C. Foundation. Leusden, Holland) p : 1-10.

19. Rangarajan, M. and P. Muthukrishnan, 1986. Measurement of N2 fixing activity of *Azotobacter chroococcum* in terms of grain yield under puddled culture systems incorporated with various carbonaceous substrates. Abst. Third Internat. Workshop on Measurement of Microbial Activities and Carbon Cycle in the Aquatic Ecosystems, Utrecht, Netherlands, p. 28.

20. Rangarajan, M. and A. S. Purushothaman, 1986. Survival and competition of inoculant rhizobial strains of mungbean in rice fallow soil. Abst. Fourth Internat. Symp. Microbial Ecology, Ljubljana, Yugoslavia, 15 (1) : 111.

21. Shahul Hameed, M., V. Udhayasuriyan and A. Balasubramanian, 1986. Soil farmyard manure mixture as an alternative carrier meterial for rhizobium inoculants. *Curr. Res.*, 14 : 30-31.

22. Singaravadivel, K. and S. Anthoni Raj, 1986. An appraisal of the commonly adopted parboiling techniques. *Agric. Rev.*, 7 (2) : 98-104.

23. Srinivasan, G., P. Pothiraj and D. Purushothaman, 1986. Influence of herbicides on biomass production and relative growth rate of *Azolla pinnata. IRRN*, 11 : 31.

24. Thanikachalam, A., and M. Rangarajan, 1986. Sugar release from paddy straw inoculated with mixed cultures of three cellulolytic fungi. *Ind. J. Microbiology*, 26 : 113-116.

25. Thanikachalam, A. and M. Rangarajan, 1986. Protein enrichment of rice straw by fermentation with *Cellulonous. Agricultural wastes*, 15 : 213-224.

Agronomy

1. Balasubramanian, P. and R. Vaithiyalingam, 1985. Nitrogen requirements and spacing for the long duration rice in Cauvery delta. *Madras Agric. J.*, 72 (9) : 537-538.

2. Balasubramanian, T. N., J. G. Robinson, R. S. Bindhumadhava Rao and V. Ravikumar, 1985. Studies on performance of different species of cotton under dry farming conditions. *Madras Agric. J.*, 72 : 35-38.

3. Korikanthimath, V. S. and SP. Palaniappan, 1985. Effect of time and quality of N on dry matter accumulation. *Madras Agric. J.*, 72 (10) : 566-70.

4. Korikanthimath, V. S. and SP. Palaniappan, 1985. Influence of time and quantity of 'N' application on the 'N' uptake pattern in sorghum CSH. 5. *Madras Agric. J.*, 72 (3) : 133.

5. Madhavan, M., V. S. Shanmugasundaram and SP. Palaniappan, 1986. Effects of population on physiological growth parameters of pigeonpea in sole and intercropped stand with sorghum CO 22. *J. Agron. and Crop Sci.*, 157 : 43-51.

6. Mohamed Ali, A 1986. Residual effects of dinitro anitine herbicide in irrigated *Arachis*, groundnut. *Madras Agric.* J., 72.

7. Mohamed Ali, A. 1986. Effect of herbicides on the protein production in *Phaseolus mungo. Madras Agric. J.*, 72 : 338.

8. Mohamed Ali, A. 1986. Weed control in low land rice nursery. *Madras Agric. J.*, 72 : 429.

9. Mohamed Ali, A. 1986. Weed competitive studies in transplanted finger millet. *Curr. Res.*, 14 : 49.

10. Muthukrishnan, P., S. Mahendran and R. Kaliappa, 1985. Biofertilizers for rice. *Madras Agric. J.*, 72 (11).

11. Pothiraj, D., 1986. Intercropping of cereals and oilseeds with chickpea. *Madras Agric. J.*, 72 (12) : 715-716.

12. Purusothaman, S., P. Jayapaul and S. Kandaswamy, 1987. Puddling method and time of fertilization in lowland paddy. *Seeds and Farms*, 13 (6) : 16-19.

13. Rajaram, S., 1985. Effect of moisture stress at different physiological stages of lowland rice. *Madras Agric. J.*, 72 : 712-714.

14. Ramasamy, S., S. Sankaran, V. Velu., U. Athmanathan and T. Rajagopal, 1987. Split application of slow release urea. *IRRN*, 12 (2) : 45.

15. Shanmugasundaram, V. S., 1985. Studies on the associate of perennial grass (NB 21) legume (Lucerne) mixture on the fertiliser and forage yield and quality. *Madras Agric. J.*, 72 (6) : 243-248.

16. Santhi, S. R and SP. Planiappan, 1986. Influence of neem leaf and nitrification in low land rice soil. *Plant and soil*, 93 : 133-135.

17. Shanthi, S. R. and SP. Palaniappan, 1986. Effect of neem leaf (*Azadiracta indica L*) on growth and yield of lowland rice. *J. Agronomy and Crop Sci.*, 157 : 714.

18. Subbiah, K. K. and G. James Martin, 1986. Management of late *Kharif* season rice *IRRN*, 11 : 30.

19. Subbian, P. and A. Chamy, 1985. Response of greengram and balckgram to super phosphate and phospal as a source of phosphorus. *Madras Agric. J.*, 72 (4) : 239-240.

20. Subbian, P. and A Chamy, 1985. Studies on the effect of NPK fertilization on the grain yield of sorghum CO 23. *Madras Agric. J.*, 72 (7) : 408-409.

21. Thangamuthu, G.S., 1985. Influence of herbicides on bio-mass production and relative growth rate of *Azolla pinnata*. *IRRN*, 2 (6).

22. Thangaraj, M., 1986. Development and testing of an improved soil root sampling technique for rice in flooded and puddled soils. *Agron. J.*, 78 : 940-942.

23. Venkataraman, N. S., O. S. Kandaswamy, S. P. Packiaraj and S. Ramiah, 1987. Integrated weed management in rice based cropping system. *Pestology*, XI (1) : 18-21.

Crop Physiology

1. Balakrishnan, K. S., S. Gopalakrishnan and N. Natarajaratnam, 1985. Influence of zinc on growth and dry matter production, nutrient uptake and yield in certain rice varieties. *Madras Agric. J.*, 72 : 25-30.

2. Balakrishnan, K., N. Natarajaratnam and K. M. Sundaram, 1985. Rapid method for the estimation of leaf area in field bean. *Madras Agric. J.*, 72 : 633-635.

3. Balakrishnan, K., K. M. Sundaram and N. Natarajaratnam, 1985 Estimating leaf area in pigeon pea (*Cajanus cajan* L.) by non-destructive method. *Madras Agric. J.*, 72 : 522-523.

4. Balakrishnan, K., K. M. Sundaram and N. Natarajaratnam, 1985. Leaf area determination in ragi by length and width method. *Madras Agric. J.*, 72 : 597-598.

5. Chandrababu, R., N. Natarajaratnam, C. Dharmaraj and G. Pathmanaban, 1985. An analysis of drought adaptive characters in certain species of *Acacia*. *South Indian Hort.*, 33 : 182-185.

6. Chandrababu, R., R. Sadasivam, P. S. Srinivasan, N. Natarajaratnam and S. R. Sree Rangaswamy, 1985. Regulation of leaf senescence and yield in blackgram by benzyladenine. *Madras Agric. J.* 72 : 262-264.

7. Chandrababu, R. and R. Sadasivam, 1985. Effect of potassium nutrition on growth and yield of blackgram. *Madras Agric. J.*, 72 : 595-596.

8. Chandrababu, R., R. Sadasivam, N. Natarajaratnam and S. R. Sree Rangaswamy, 1985. Photosynthesis in relation to yield potential in blackgram. *Madras Agric. J.*, 72 : 152-155.

9. Chandrababu, R., R. Sadasivam, P. S. Srinivasan and N. Natarajaratnam, 1985. Timing of pod developmental characteristics in blackgram. *Madras Agric. J.*, 72 : 102-107.

10. Chandrababu, R., P. S. Srinivasan, N. Natarajaratnam and G. Dharmaraj, 1986. Alternate selection indices for photosynthetic rate in *Vigna mungo* (L) Hepp. cultivars. *Photosynthetica*, 20 (2) : 157-160.

11. Natarajaratnam, N., T. Venkateswara Rao and G. Pathmanaban, 1985. Seed and seedling physiology of cowpea genotypes. *Madras Agric. J.*, 72 : 31-34.

12. Natarajaratnam, N., T. Venkateswara Rao and G. Pathmanaban, 1985. Physiological basis of growth and yield attributes in cowpea genotypes. *Madras Agric. J.*, 72 : 765-770.

13. Natarajaratnam, N., T. Venkateswara Rao and K. Balakrishnan, 1985. Path analysis of yield components in cowpea. *Madras Agric. J.*, 72 : 259-262.

14. Natarajaratnam, N., S. Mohandoss and R. Chandrababu, 1985. Relationship between petiole length and leaf area in cotton. *Madras. Agric J.*, 72 : 416-418.

15. Sadasivam, R., R. Chandrababu, N. Natarajaratnam and S. R. Sree Rangaswamy, 1987. Physiological attributes limiting productivity in *Vigna radiata* and *Vigna mungo. Proc. Seventy Fourth Session of Indian Science Congress, Bangalore.*

16. Srinivasan, P. S., R. Chandrababu, N. Natarajaratnam and S. R. Sree Rangaswamy, 1985. Effect of benzyladenine on the retradation of leaf senescence and yield in greengram. *Madras Agric. J.*, 72 : 67-71.

17. Srinivasan, P. S., R. Chandrababu and N. Natarajaratnam, 1985. The pattern of pod development in greengram (*Vigna radiata L* Wilczek). *Madras Agric. J.*, 72 : 218-221.

18. Srinivasan, P. S. and K Mohan Naidu, 1986. Effect of zinc and the seedling growth and micronutrient status in rice cultivars. (*Oryza sativa* (L)). *The Philippines Journal of Crop Science*, 11 (3).

19. Srinivasan, P. S. and K. Mohan Naidu, 1986. Effect of zinc on EC, endosperm weight, germination and vigour of three rices. *IRRN*, 11 (2) : 16-17.

20. Srinivasan, P. S., R. Chandrababu and N. Natarajaratnam, 1986. Diurnal variation of certain leaf physiological characters in irrigated and un-irrigated mungbean, *Vigna radiata* (L) wilczek. *The Philippines Journal of Crop Science*, 10 (3) : 157-160.

21. Subburamu, K., N. Natarajaratnam, and R. Chandrababu, 1985. Effect of foliar application of K on C^{14} carbon assismilate partitioning greengram. *Madras Agric. J.*, 72 : 459-460.

22. Thandapani, V., 1985. Leaf growth attributes as comparative physiological factors for the genotypes of greengram (*Vigna radiata* (L) Wilczek) in relation to yield. *Madras Agric. J.*, 72 (3) 126-132.

23. Thandapani, V., 1985. Seed and seedling physiology of greengram genotypes (*Vigna radiata* (L) wilczek) in relation to yield. *Madras Agric. J.*, 72 (2) : 71-77.

24. Thandapani, V., 1985. Nutrient content of nitrogen, phosphorus, potassium, calcium and magnesium in greengram (*Vigna radiata* (L) wilczek) at different growth stages in relation to yield. *Madras Agric. J.*, 72 (6) : 305-310.

Nematology

1. Sivakumar, M. and T. Marimuthu, 1986. Efficacy of different organic amendments against phytonematodes associated with betelvine (*Piper betle L.*). *Indian. J. Nematology*, 16 (2) : 278.

2. Sivakumar, M. and T. Marimuthu, 1986. Population dynamics of phytonematodes associated with betelvine (*Piper betle L.*), banana and paddy with special reference to crop rotation. *Indian J. Nematology*, 16 (2) : 277.

Plant Pathology

1. Alice, D. and A. V. Rao, 1986. Management of seed borne *Drechslera oryzae* of rice with plant extracts. *IRRN*, 11 (3) : 19.

2. Arjunan, G., R. Samiyappan and C. Natarajan, 1986. Field screening of pigeonpea types of *Phyllosticta* leaf spot. *International Pigeonpea Newsletter*, 5 : 36.

3. Alagarsamy, G. and R. Bhaskaran, 1986. Effect of foliar spray of macro and micronutrients on sheath rot (Sh. R) incidence and rice grain yield. *IRRN*, 11 (4) : 27-28.

4. Alagarsamy, G and R. Bhaskaran, 1986. Effect of form and level of N fertilizers on sheath rot (Sh. R) incidence and yield. *IRRN*, 11 (6) : 18.

5. Alagarsamy, G., D. Alice and S. Palanisamy, 1986. Chemical control of brownspot (BS) and sheath rot (SHR) in Tamil Nadu. *IRRN*, 11 (5) : 18.

6. Alagianagalingam, M. N., T. K. Kandaswamy and V. Narashimhan, 1986. Efficiency of fungicides in control of leaf blight of onion. *Pestology*, X : 9-10.

7. Gunasekaran, M., N. Ramadoss, M. Ramiah, R. Bhaskaran and T. Ramanathan, 1986. Role of neem cake in the control of Thanjavur wilt of coconut. *Indian Coconut J.*, 17 (1) : 7-12.

8. Lakshmanan, P. and M. Chandrasekaran Nair, 1986. Comparative studies on morphology and physiology of fungi isolates of *R. solani*. *Madras Agric. J.*, 72 : 388-393.

9. Lakshmanan, P. and M. C. Nair, 1986 Effect of soil fungicides on *Rhizoctonia solani* Kuln. *Pesticides*, 20 (3) : 35.

10. Lakshmanan, P. and Selvaraj, 1986. Phytotoxic effect of carbendazim on CO 1 Jathimalli *(Jasminum grandiflorum)*. *Pesticides*, 22 (3) : 19.

11. Lakshmanan, P., S. Palaniswamy and R. Jeyarajan, 1986. Identification of some sources of resistance to sugary disease of sorghum in Tamil Nadu. *Bulletin of Pure and Applied Science*, 2 (1-2).

12. Lewin, H. D., V. Mariappan and S. Chelliah, 1986. Granular fungicides for control of blast (BL). *IRRN*, 11 (3) : 16-17.

13. Lewin, H. D., V. Mariappan and S. Chelliah, 1986. Evaluation of new fungicides in controlling blast (BL). *IRRN*, 11 (6) : 19.

14. Lewin, H. D. and P. Vidhyasekaran, 1986. Control of rice blast by fungicide treated seed. *IRRN*, 11 (6) : 19.

15. Lewin, H. D. and P. Vidhyasekaran, 1987. Controlling sheath rot in rice. *IRRN*, 12 (2) : 17.

16. Mariappan, V., V. Narasimhan, S. Muthuswamy and G. S. Khush, 1987. Reaction of IR lines to RTV. *IRRN*, 12 (2) : 14-15.

17. Mariappan, V., A. Thiagarajan and S. Chelliah, 1986. Effect of fertilizers, nutrients and soil amendment on tungro virus (RTV). *IRRN*, 11 (2) : 5

18. Mohan, L., P. Manivasakam, S. Palanisamy and R. Jeyarajan, 1985. Response of pearl millet lines to diseases. *Millets Newsletter*, (5) : 18.

19. Muthuswamy, S. and N. Ragupathy, 1986. Studies on the efficacy of vitavax in the control of blackgram rust. *Pesticides*, 20 : 29-30.

20. Narasimhan, V. and M. N. Alagianagalingam, 1986. Potassium in the management of chilli mosaic disease. *J. Pot. Res*, 3 : 59-64.

21. Narasimhan, V., V. Mariappan, S. Muthuswamy and S Rajasekaran, 1987. Screening rice varieties for resistance to rice tungro. *IRRN*, 12 (2) : 16.

22. Natarajan, S., R. Bhaskaran and N. Shanmugam, 1986. Preliminary studies to develop techniques for early detection of Thanjavur wilt in coconut. *Indian Coconut J.*, 17 (3) : 3-6.

23. Saroja, R., M. Suriachandraselvan and N. Raju, 1986. Correlation between GLH incidence and tungro (RTV). *IRRN*, 11 : 3.

24. Saroja, R., M. Suriachandraselvan, N. Raju and T. B. Ranganathan, 1987. Multiple resistance of BG 367-3 to major insect pests and diseases. *IRRN*, 12 (1) : 9-10.

25. Samiyappan, R. and G. Arjunan, 1986. Resistance of pigeonpea to sterility mosaic in Southern India. *International Pigeonpea Newsletter*, 5 : 37-38.

26. Sivaprakasam, K., F. Salal Rajan and R. Jeyarajan, 1986. *Pleurotus citrinopileatus*, a new Indian edible mushroom. *Curr. Sci.*, 55 : 1203.

27. Suriachandraselvan, M., R. Saroja, P. Vivekanandan, J. Venkatakrishnan and K. Nilakandapillai, 1986. Field evaluation of rice cultures/varieties against RTV. *IRRN*, 11 : 2.

28. Suriachandraselvan, M., R. Saroja and N. Raju, 1986. Effect of planting date on tungro virus incidence (RTV). *IRRN*, 11 : 2.

29. Suriachandraselvan, M., R. Saroja and T. B. Ranganathan, 1986. Epidemiology of rice tungro virus (RTV) in 1984-85 Kharif, Chingleput District, Tamil Nadu. *IRRN*, 11 : (6) 21-22.

30. Thiagarajan, P., K. M. Ramanathan and V. Mariappan, 1986. Effect of phosphorus on bacterial leaf blight (BB). *IRRN*, 11 (2) : 22.

31. Vivekanandan, P., T. B. Ranganathan and M. Kadambavanasundaram, 1986. Susceptibility of rice hybrids to blast. *IRRN*, 12 (1) : 6-7.

Seed Technology

1. Jayaraj, T., K. Vanangamudi, V. Palanisamy, and T. V. Karivaratharaju, 1986. Production and storage of sorghum seed. *Seeds and Farms*, XIII (5) : 15.

2. Jayaraj, T. and V. Ramakrishnan, 1986. Seed recovery percentage as influenced by application of pesticides spray. *Seeds and Farms*, 12 (8) : 10-11.

3. Jayaraj, T. and T. V. Karivaratharaju, 1985. Storage of high moisture paddy seeds. *Madras Agric. J.*, 72 (5) : 249.

4. Karivaratharaju, T. V. and V. Ramakrishnan, 1985. Effect of pre soaking seed treatment with chemical growth regulants on seed yield and quality in redgram, *cajanus cajan*. *Madras Agric. J.*, 72 (5) : 249.

5. Karivaratharaju, T. V. and V. Ramakrishnan, 1986. Seed hardening studies in two varieties of ragi, *Eleusine coracana. Ind. J. P. Physiology*, XXVIII (3): 243-

6. Krishnaveni, K. and K. Vanangamudi, 1986. Maize seed technology. *Seeds and Farms*, XII (4) : 21.

7. Karivaratharaju, T. V. and V. Ramakrishnan, 1985. Effect of sodium chloride foliar spray on chemical composition of rice seed. *Oryza*, 22 : 214-218.

8. Palanisamy, V. and T. V. Karivaratharaju, 1986. Studies on seed development and maturation in annual moringa. *Veget. Sci.*, 12 (2) : 74.

9. Ponnusamy, A. S. and V. Ramakrishnan, 1985. Seed size in relation to imbibition, emergence and speed of emergence in peanut. *Madras Agric. J.*, 72 (1): 53-56.

10. Ponnusamy, A. S. and V. Krishnasamy, 1986. Incidence of discolouration of panicle of ms 2077A. *Madras Agric. J.*,

11. Ramakrishnan, V. and T. V. Karivaratharaju, 1985. Effect of time of harvest and decortication of pods on viability and vigour in groundnut *Madras agric. J.*, 72 (9).

12. Vaithialingam, R., 1985. Seed dormancy in *Kuruvai* rice. *Madras Agric. J.*, 72 (6) : 350.

13. Vanangamudi, K. and T. V. Karivaratharaju, 1986. Effect of Pre-storage chemical fortification of seeds on shelf life of redgram, blackgram and greengram seeds. *Seed Sci. Tech.*, 14 : 1-6.

14. Vanangamudi, K. and K. R. Ramaswamy, 1985. Influence of season and NPK nutrients on the growth and flowering of MS 5141A and the yield of KM 2 bajra hybrid seed. *Madras Agric. J.*, 72 (3) : 121-125.

15. Vanangamudi, K. and T. V. Karivaratharaju, 1986. Effect of stage of harvest on seed quality of pigeonpea cultivars. *International Pigeonpea Newsletter*, 5 : 31-32.

16. Vanangamudi, K. and T. V. Karivaratharaju, 1986. Seed quality of CS 3541 sorghum as influenced by provenance of production and depth of sowing. *Madras Agric. J.*, 72 (4) : 226-227.

17. Vanangamudi, K. and T. V. Karivaratharaju, 1986. Seedling drymatter production as a measure of seed vigour in sorghum and maize genotypes. *Seeds and Farms*, XII (4) : 28

18. Vanangamudi, K., T. V. Karivaratharaju, K. Balakrishnan, Mallika Vanangamudi and N. Natarajaratnam, 1986. Effect of stage of harvest in seed quality in pigeonpea cultivars. *International Pigeonpea Newsletter*, 5 : 31-32.

Soil Science and Agricultural Chemistry

1. Gopalswamy, A., M. Veeramani and P. Paramasivam, 1986. Efficiency of ferrous sulphate, pyrite and organic manures on the metabolically active iron and chlorophyll content of fresh leaves in sorghum crop. *Madras Agric J.*, **72**: 641-643.

2. Krishnaswami, R., T. S. Manickam and G. V. Kothandaraman, 1985. Influence of phosphorus and micronutrients on the yield and uptake of NPK in cowpea Var. CO 3. *Madras Agric. J.*, 72 : 181-184.

3. Kumaresan, K. R., M. Dhakshinamoorthy and T. S. Manickam, 1985. Diagnosis and characteristics of the typical oilseeds growing soils of the North-Eastern zone of Tamil Nadu. *Madras Agric. J.*, 72 : 609-612.

4. Kumaresan, K. R., R. Nagarajan, P. Savithri and T. S. Manickam, 1985. Effect of continuous cropping and fertilization on depletion of micronutrients. *Madras Agric. J.*, 72 : 371-375.

5. Kumaresan, K. R., P. Savithri, T. S. Manickam and G. V. Kothandaraman, 1985. Studies on the effect of soil and foliar application of zinc and iron on chewing tobacco var. Oosikappal. *Madras Agric. J.*, 72 : 475-477.

6. Kumaresan, K. R., P. Savithri, T. S. Manickam, G. V. Kothandaraman and K. Charles Daniel, 1985. Comparative efficacy of soil and foliar application of $ZnSO_4$ and $FeSO_4$ on sugarcane. *Madras Agric. J.*, 72 : 190-192.

7. Kumaresan, K. R., P Savithri, T. S Manickam, G. V. Kothandaraman and K. Charles Daniel, 1985. Effect of application of pressmud, $ZnSO_4$, and $FeSO_4$ on yield and quality of sugarcane. *Madras Agric. J.*, 72 : 701-705.

8. Nagarajan, R., G. V. Kothandaraman and T. S. Manickam, 1985. Environmental pollution of irrigation water of Amaravathi River System. *Madras Agric. J.*, 72 : 584-586.

9. Nagarajan, R., T. S. Manickam and G. V. Kothandaraman, 1985. Manurial value of coir pith. *Madras Agric. J.*, 72 : 533-535.

10. Paramasivam, P. and Rani Perumal, 1986. Path coefficient analysis on yield contribution of rice grown under alkali soils. *Madras Agric. J.*, 72(11): 641-643.

11. Ramanathan, P. and G. V. Kothandaraman, 1985. Effect of methods of phosphate application on the yield, content and uptake of phosphorus at different stages of crop growth by rice IR 20. *Madras Agric. J.*, 72 : 77-81.

22. Sundararajan, S. and D. Veeraraghavathatham, 1986. CO 2 snakegourd. *South Indian Hort*., 34 (1) : 59.

23. Vadivel, E., S. Annadurai and K.G. Shanmugavelu, 1986. Nucleic acids, proteins and ascorbic acid during ontogeny of banana cultivars Monthan and Robusta. *Banana Newsletter*, 9:25-27.

24. Vinayagamoorthy, A., M. Kader Mohideen, JBM. Md. Abdul Khader, V. Prakasam and R. Jeyarajan, 1986. Fungicidal control of root rot of fenugreek. *South Indian Hort*., 34 (1) : 54-55.

25. Vinayagamoorthy, A., M. Kader Mohideen, B. Jayaram and V. Prakasam, 1986. Fungicidal control of powdery mildew on coriander. *South Indian Hort*., 34 (1) : 47-48.

AGRICULTURAL ENGINEERING

1. Manian, R., R. Boopalan, C. Ramasamy and K. Natarajamoorthy, 1986. Development and performance evaluation of urea super granule applicator for paddy. *J. Agric. Engg*., 23 (4).

2. Palaniswamy, P. T. and A. Dakshinamoorthy, 1986. Biogas for the control of storage pests of rice. *IRRN*

3. Rajasekaran, P., R. Murugesan and K. Palanisamy, 1986. Influence of temperature on microbial numbers and biogas production of some anaerobically digested wastes. *Agric. Wastes*, 17 (2) : 83-90.

4. Rajasekaran, P., K. Chendrayan and K. R. Swaminathan, 1987. Energy generation through anaerabic biodigestion of oilcake incorporated organic wastes. *Rural Technology Journal*, 25-33.

5. Sreenarayanan, V. V. and P. K. Chattopadhyay, 1986. Specific heat of rice bran. *Agricultural Wastes*, 16 (3) : 225-236.

6. Sreenarayanan, V. V. and P. K. Chattopadhyay, 1986. Factors influencing effectiveness of radio frequency directive heating on rice bran. *AMA*., 17 (4) : 71-74.

7. Sreenarayanan, V. V., R. Viswanadhan and V. Subramaniyan, 1987. Agricultural waste fuelled furnace for mechanical dryers. In Souvenir of Seventh Indian convention of Food Scientists and Technologists, CFTRI campus, No. APP 21, P. 89.

8. Sreenarayanan, V. V. and P. K. Chattopadhyay, 1986. Rice bran stabilisation by directive heating. *J. Food Processing and Preservation*, 10 (2) : 89-98.

9. Sreenarayanan, V. V., P. K. Chattopadhyay, and K. V. Rao, 1986. Directive properties of rice bran. *J. Food Process Engineering*, 8 (4) : 231-242.

10. Sreenarayanan, V. V. and P. K. Chattopadhyay, 1986. Thermal conductivity and diffusivity of rice bran. *J. Agric. Engg. Res.*, 34 (2) : 115-121.

11. Swaminathan, K. R., S. Narayanan, V. Murugesan and P. Devasanapathy, 1986. Role of agricultural engineering in high productivity in dryland agriculture. *Agricultural Engineering To-day*, 10 (6).

12. Tajuddin, A. and R. Karunanithi, 1986. Devices for plucking fruits. *Invention Intelligence*, February, 1986.

13. Tajuddin, A., 1986. Effect of engine speed on slip and fuel consumption in a mini-dozer. *Journal of the Institution of Engineers*. Vol-67. Part A61.

14. Tajuddin, A. and R. Karunanithi. Improved iron plough. *Invention Intelligence*, February, 1987.

WATER TECHNOLOGY

1. Ilangovan, M., R. Kulandaivelu and RM. Panchanathan, 1987. Soil and climate based irrigation schedule for rice. *IRRN*, 12 (2) : 38.

2. Iruthayaraj, M. R., 1986. Effect of irrigation regimes and nitrogen levels on wheat HD. 2199. *Agric. Sci. Digest*, 6 : 112-113.

3. Krishnamurthy, V. V., A. Rangaswamy and M. R. Iruthayaraj, 1986. Effect of irrigation at crop stages on *Sesamum indicum* L. rantees. *Agric. Sci. Digest*, 6 : 69-76.

4. Marimuthu, R., and R. Kulandaivelu, 1987. Irrigation management for low land rice under water constraint. *IRRN*. 12 (1).

VETRINARY AND ANIMAL SCIENCES

Animal Husbandry Economics

Prabaharan, R. and S. N. Sivaselvam, 1986. A comparative analysis of price spread for eggs in Madras market 1981 & 1985. *Indian Journal of Agricultural Economics*, 40 (3).

Animal Genetics

1. Mohan, M., V. Ulaganathan, I. M. Rodricks, C. K. Bhuvanakumar, and M. Iyue, 1986. Reproduction rate and viability of Merino, Nilagiri and halfbred Merino - I. Fertility, Prolificacy and Viability. *Tropical Animal Health and Production*, 18 : 171-176.

2. Mohan, M., V. Ulaganathan, I. M. Rodricks, C. K. Bhuvanakumar and M, Iyue, 1986. Reproduction rate and viability of Merino, Nilagiri and halfbred Merino - II Age specific replacement rate and net reproduction rate. *Tropical Animal Health and Production*, 18 : 177-183.

3, Mohan, M. and V. Ulaganathan, 1986. Repeatability of reproduction rate in Merino, Nilagiri and their crosses. *Indian Veterinary J.*, 63 : (3) 222-226.

Animal Nutrition

1. Ebenezer, E., R. Raman and R. Kadirvel, 1986. The nutritive value of Uthi leave as green fodder for goats. *Cheiron*, 15 : 210-215.

2. Kadirvel, R., R. Natanam and K. Udayasurian, 1986. Use of kapok as a poultry feed. *Poultry Science*, 65 : 363-365.

3. Kathaperumal, V. and Bernard Muthu, 1986. A note on recycling of swine excreta for feeding calves. *Cheiron*, 15.

4. Murugan, M., V. Kathaperumal and S. Jothiraj, 1986. Nutritive value of *Stylosanthes hamata* at different stages of maturity. *Cheiron*, 15 (3).

5. Poyyamozhi, V. S. and R. Kadirvel, 1986. The value of banana stalk as a feed for goats. *Animal Feed Science and Technology*, 15 : 95 - 100.

6. Ravi, R., V. Jaganathan, M. Murugan and K. A. Doraiswamy, 1986. Invitro studies on the effect of benzene hexachloride on total volatile fatty acids and rumen microbes of cattle. *Cheiron*, 15 : 3 - 8.

Clinics

1. Gunaseelan, L., P. Ramadoss and N. Raghavan, 1985. Epidemiological studies on Toxocara canis infection. *Cheiron*, 14 (6).

2. Gunaseelan, L., P. Ramadoss and N. Raghavan, 1986. Serological diagnosis of toxocara canis infection in children in Madras city. *Ind. Vet. J.*, 63 (10).

3. Easwaran, B. M., 1986. A study on the protein components of the seminal plasma of Indian cattle. *Cheiron*, 15 (3) : 71.

4. Kalatharan, J., M. John Edwin and B. M. Easwaran, 1986. Freezability of ram semen diluted in Cornell University Extender and Tris Diluents. *Cheiron*, 15 (6): 206

Gynaecology

1. Chandrahasan, C., S. R. Pattabiraman and V. Venkataswami, 1986. Studies on the effect of glasswool column filtration on the quality of semen of cross bred bulls. *Indian Vet. J.*, 63 : 913-918.

2. Pattabiraman, S. R. and V. N. Seshagiri, 1986. Early pregnancy diagnosis in dairy cows. *Milcow*, 4 : 23.

3. Pattabiraman, S. R., C. Veerapandian and S. A. Quayam, 1986. Effects of receptal treatment in anoestrus and early postmartem cows and buffaloes. *Indian Vet. J.*, 63 : 409-413.

4. Subramanian, A., and S. R. Pattabiraman, 1986. Cytohormonal indices in different reproductive conditions in bovines. *Indian J. of Animal Reproduction*, 7 (2) : 36-39.

5. Sudarsanam, V., S. R. Pattabiraman and V. Venkataswami, 1986. Buffalo seminal antibodies : Its detection and titration by geletics agglutination and tube slide agglutination tests. *Indian J. of Animal Reproduction*, 7 (2) : 9-13.

Meats

1. Ramaswami, A.M., P. Ayyalusami, V. Sundararasu and A. M. Shanmugam, 1986. Influence of low-energy finisher ration on carcass traits in Large White Yorkshire pigs. *Cheiron*, 19 : 3.

2. Mohan, B., D. Narahari, E. S Venkatesan, R. Ramamurthi and L. Alfred Jayaprasad, 1986. Studies on the influence of age and sex on the meat characteristics of Japanese quail. *Kerala J. Vet. Sci.*, 17 (1) : 53-67.

Microbiology and Biochemistry

1. Ambrox, D., S. R. Pattabiraman and R. A. Venkatesan, 1986. Types and incidence of aerobic bacteria in different puerperal conditions in bovines. *Cheiron*, 15 (5) : 176-179.

2. Balachandran, C., J. S. Moses, 1986. Rhinosporidiosis in a cow. *Indian J. Comp. Microbil. Infect. Dis.*, 7 (2 & 3) : 108-110.

3. Bhatnagar, R. N., K. R. Mittal, T. N. Jaiswal, and C. D. Padmanaban, 1986. Levels of complement activities in the sera of apparently healthy sheep. *Indian Vet. J.*, 63 : 879-894.

4. Bhatnagar, R. N., K. R. Mittal, T. N. Jaiswal and V. D. Padmanaban, 1986. Levels of complement activities in the sera of apparently healthy camels. *Indian Vet. J.*, 64 : 193-195.

5. Moses, J. S., C. Balachandran and Lalitha John, 1986. Rhinosporidiosis in a cow in Thanjavur district (Tamil Nadu). *Indian Vet. J.*, 63 (5) : 420-421.

6. Moses, J. S. and A. Shanmugam, 1987. Epidemiological survey of Rhinosporidiosis in man - A sample survey in a high school located in hyperendemic area. *Indian Vet. J.*, 64 (1) : 34-38.

7. Palaniswami, K. S., 1986. An outbreak of *Salmonella weltererden* in a broiler farm. *Cheiron*, 15 (2) : 15-16.

8. Palaniswami, K. S., 1986. A pragmatic approach in the control of poultry diseases. *Poultry Flash*, 1 (5) : 4-6.

9. Palaniswami, K. S. and P. R Masillamany, 1986. Testing methods of *Salmonella* in poultry and its environment. *Poultry Guide* (Disease special), 23 (11) : 199-203.

10. Rajan, T. S. S. and V. D. Padmanaban, 1986. Diagnosis of rabies with glycaemia in herbivores. *Indian Vet. J.*, 64 : 274-279.

11. Rajan, T. S. S. and V. D. Padmanaban, 1986. Corneal impression smears by fluorescent antibody technique. *Indian Vet. J.*, 63 : 882-888.

12. Selvakumar, R., V. D. Padmanaban and R. A. Balaprakasam, 1986. Comparative evaluation of diagnostic techniques for the detection of rinderpest antigen, *Indian Vet. J.*, 63 : 977-981.

Parasitology, Madras

1. Anandan, R. and E. Ebenezer Raja, 1987. Preliminary trials with Praziquantel in *Schistosoma nasale* infection in sheep and goat. *Indian Vet. J.*, 64 : 108-110.

2. Anandan, R., V. Varadarajan, G. Karunamoorthy and C. M. Lalitha, 1986. A note on *Trypanosoma theileri* in buffaloes. *Cheiron*, 15 (5) : 191-193.

3. Bhasker, C. G. and S. A. Joseph, 1986. The large round worm of horse, *Parascasis equorum*. *Centaur*, 2 (4) : 149-150.

4. Bhasker, C. G. and S. A. Joseph, 1986. The horse fly (*Tabanus*). *Centaur*, 3 (1) : 15-19.

5. Bhasker, C. G and S. A. Joseph, 1986. Tapeworms of horses. *Centaur*, 3 (3) : 99-101.

6. Ebenezer Raja, E., S. A. Joseph and C. M. Lalitha, 1986. Experimental transmission of *Anaplasma marginale* in crossbred calves by the argasid tick, *Ornithodoros savignyi*. *Cheiron*, 15 (2) : 49-50.

7. Ebenezer Raja, E., S. A. Joseph and C. M. Lalitha, 1986. Vector potential in relation to the incidence of bovine theileriasis in Tamil Nadu. *Cheiron*, 15 (4) : 110-112.

8. Joseph, S. A., 1986. Tapeworms of poultry. *Poultry Guide*, 23 (11) : 101-104.

9. Joseph, S. A., G. Karunamoorthy, C M Lalitha and Daniel Joy Chandran, 1986. A note on the occurrence of *Haematopinus quadripethtusus* in dairy cattle in Tamil Nadu. *Cheiron*, 15 : 4. 137-140.

10. Karunamoorthy, G. and R. Nagarajan, 1986. Occurrence of *Dirhinus pachycerus* Masi (Hymenoptera : Chalcidoidea). A Parasitoid of *Musca* sp. *Cheiron*, 15 : 31.

11. Karunamoorthy, G. and R. Nagarajan, 1986. A field trial with Mebendazole (Robendol (R)) in sheep. *Indian Vet. J.*, 63 : 855-856.

12. Karunamoorthy, G., 1985. Trichomoniasis infection in pigeons - A case study. *Madras Agric. J.*, 11 : 652.

13. Koshy, T. J. and E. Ebenezer Raja, 1986. Scanning electron microscopic studies on the ultrastructure of the eggs of Taeniids of dogs. *Current Science*, 55 (16) : 811.

14. Manickam, A., A. Palaniswami and S. Neelakantan, 1985. Mycotoxicosis in buffaloes. *Indian Vet. J.*, 62 : 711-714.

15. Rahamathulla, P. S., E. Ebenezer Raja, R. V. Suresh and K. Gajendran, 1986. Field trials with *Morantel cigrate* (Banmith II-Prizer) in dairy cattle. *Indian Vet. J.*, 63 : 501-503.

16. Ramachandran, P. V., K. R. Parthasarathy and S. A. Shakir, 1986. Schistosoma spindale in an aberrent cutaneous lesion in a cow. *Indian Vet. J.*, 63 : 504-505.

17. Subbiah, T. V. and S. A. Joseph, 1986. Studies on the bionomics and vector potential of the pigeon fly *Pseudolyncfia canariensis* in the transmission of *Haemoproteus columbae* in pigeons. *Cheiron*, 15 : 4, 113-118.

Pharmacology

Thejomoorthy, P. and R. Natarajan, 1986. Pharmacological evaluation of R compound and Amukkura choornum for anti-inflammatory activity. *Ind. Vet. J.*, 63 : 548-552.

Poultry Science

1. Abdul Mujeer, K., P. Kothandaraman, V. Sethumadhavan, K. Gajendran and D. Narahari, 1986. Effect of certain pre-incubation storage conditions on heritability of chicken eggs. *Indian J. Poult. Sci.*, 22, (3) : 215-218.

2. Narahari, D., V. Venkataramanujam and V. Sundararasu, 1986. A study on the mortality pattern in Desi and Khaki Campbell ducks reared under confined system. *Indian Poultry Rev.*, 18, (8) : 15-17.

3. Narahari, D., N. Ramamurthi, S. Viswanathan, A. Thangavelu, B. Muruganandan, V. Sundarasu and K. Abdul Mujeer, 1986. The effect of rearing system and marketing age on the performance of Japanese quail. *Cheiron*, 15(5): 160-163.

4. Narahari, D., K. Venugopal and P. Kothandaraman, 1986. Studies on the utilisation of rubber kernel oil meal in White Leghorn breeder. *Indian J. Poult. Sci.*, 22, 1, 5-10.

5. Narahari, D., K. Venugopal, V. Venkataraman and P. Kothandaraman, 1986. The effect of processing on the nutritional value of rubber seed oil meal for layers. *Indian J. Poult. Sci*, 22 (3) : 208-214.

6. Narahari, D., K. Venugopal, V. Venkataramanujam and P. Kothandaraman, 1986. Utilisation of rubber seed oil and oil meal in broiler diets. *Indian J. Poult. Sci.*, 22 (2) : 105-109.

7. Parivalial, A. V., D. Narahari, D. Thyagarajan and P. Kothandaraman, 1986. Studies on relative efficacy of different routes and schedules of new castle disease vaccination in broiler chicks. *Cheiron*. 15 (5) : 169-175.

8. Ramamurthy, N., D. Narahari, P. Kothandaraman, V. Sundararasu and V. Sethumadhavan, 1986. Studies on the semen characteristics and their association with age and body weight of White Cornish sires. *Indian J. Poult. Sci.*, 22 (4) : 291-295.

FISHERY SCIENCE

1. Santhanam, R., N. Sukumaran, K. Venkataramanujam and G. Jegatheesan, 1987. Pole farming of edible oysters in brackish waters. *Aquaworld* 2 (2) : 55.

2. Sukumaran, N., 1986. Oxygen consumption, carbon-di-oxide output and nitrogen excretion in cichlid fish, *Oreochromis mossambicus* (peters), with special reference to swimming speed. *Proc. Indian Acad. Sci.*, 95 (2) : 215-222.

3. Sukumaran, N. and M. N. Kutty, 1986. Quantitative studies on muscle and liver glycogen utilisation during sustained swimming in freshwater mullet, *Rhinomugil corsula (Hamilton)* *Proc. Indian. Natl. Sci. Acad.*, 52 (4): 471-475.

4. Velayutham, P , R. Santhanam and G. Jegatheesan, 1987. Fish sauce, a new and promising by-product. *Fishing chemis*, 6 (12) : 64.

5. Velayutham, P., R. Santhanam and G. Jegatheesan, 1987. Industrial uses of prawn shell wastes. *Shipping* and *Marine Industries Journal*, 11 (3) : 21.

6. Venkataramanujam, K., 1986. Anatomy of sperm whale, *Physeler calodon*. XI International Sobre maniferos Marioros Guaymas, Sonora, Mexico - 6 pp.

RESEARCH COUNCIL

Chairman

Vice-Chancellor	:	Dr. V. Rajagopalan

Member-Secretary

Director of Research (Agri.)	:	Dr. M. Balasubramanian

Members

Official Members

Registrar	:	Dr. N. Shanmugam
Dean (P. G. Studies)	:	Dr. V. D. Guruswamy Raja
Dean (Agri.), Coimbatore	:	Dr. K. R. Ramaswamy
Dean (Hort.), Coimbatore	:	Dr. K. G. Shanmugavelu
Dean (Engg.), Coimbatore	:	Dr. V. Subramaniyan
Dean (Agri.), Agricultural College & Res. Institute, Madurai	:	Dr. T. Kumaraswami
Dean, Madras Veterinary College, Madras	:	Dr. P. Kothandaraman
Dean (Agri.), Agricultural College, Killikulam	:	Dr. T. K. Kandaswamy
Dean, Veterinary College, Namakkal	:	Dr. R. Ramamurthi
Dean, Fisheries College Tuticorin	:	Dr. G. Jegatheesan (Additional charge)
Director, School of Genetics	:	Dr. S. R. Sree Rangasamy
Director, Centre for Plant Protection Studies	:	Dr. S. Jayaraj
Director, Centre for Soil & Crop Management Studies	:	Dr. S. Subramanian

Director of Research (Animal Sciences), Coimbatore	:	Dr. S. Venkatayan (upto 30.4.86) Dr. C. V. Gopalakrishnan (from 1.5.86 to 31.7.86) Dr. P. Kothandaraman (Additional charge from 1.8.86)
Director, Institute of Animal Nutrition, Kattupakkam	:	Dr. C. V. Gopalakrishnan (Additional charge upto 31.7.86) Dr. P. Kothandaraman (Additional charge from 1.8.86)
Director, Animal Health Tiruchirapalli	:	Dr. T. M. Thangaraj
Director, Tamil Nadu Rice Res. Institute, Aduthurai	:	Dr. S. Chelliah
Director, Water Technology Centre, Coimbatore	:	Dr. V. Subramaniyan (Additional charge upto 21.12.86) Dr. P. Kandaswamy (from 22.12.86)
Director of Extension Education, Coimbatore	:	Dr. S. R. Sree Rangasamy (upto 15.4.86) Dr. S. Sankaran (from 16.4.86)
Director, CARDS, Coimbatore	:	Dr. A. Kandaswamy
Director of Agriculture	:	Thiru N. Athimoolam, I. A. S.,
Director of Horticulture and Plantation Crops	:	Thiru V. Lakshmanan
Director of Agricultural Marketing	:	Thiru M. Sankaraiah (upto 30.6.86)
	:	Thiru P. Manickavasagam (Incharge from 1.7.86 to 16.7.86) Thiru A. Ethirajan (from 17.7.86 to 31.12.86) Thiru S. Balasubramanian (Incharge from 1.1.87 to 4.2.87) Thiru P. Karuppannan (from 5.2.87 to 6.3.87) Thiru S. Balasubramanian (Incharge from 13.3.87 to 30.6.87)

Director of Animal Husbandry	:	Dr. S. Rangaraj (upto 31.10.86)
		Thiru K. Allaudin, I.A.S., (from 1.11.86 to 24.3.87)
		Dr. C. Kalyanasundaram (from 25.3.87)
Chief Conservator of Forests	:	Thiru S. Kondas, I.F.S.
Chief Engineer (Agrl. Engg)	:	Thiru S. Savadamuthu
Chief Engineer (Agrl. Engg) River Valley Project	:	Thiru S. Gopalan (from 1.4.86 to 31.7.86)
		Thiru K. T. Narayanan (from 1.8.86)
Director of Fisheries	:	Thiru L. K. Tripathy, I.A.S. (upto 31.10.86)
	:	Thiru V. Manivannan, I.A.S. (from 1.11.86)
Director of Oilseeds	:	Thiru C. Narayanan
Director (Seed Certification)	:	Thiru P. Manickavasagam

Heads of Departments

Dr. N. Natarajaratnam,
Professor and Head,
Crop Physiology,
Tamil Nadu Agricultural University,
Coimbatore.

Dr. P. Mahalingam,
Professor and Head,
Dept. of Investigation and Control
Madras Veterinary College,
Madras.

Dr. N. Raghavan,
Professor and Head,
Dept. of Preventive Medicine,
Madras Veterinary College,
Madras.

Dr. G. Soundrapandian,
Professor and Head,
Agrl. Botany,
Agrl. College & Research Institu
Madurai.

Dr. V. Meenkshisundaram,
Professor and Head,
Agrl. Economics,
Tamil Nadu Agrl. University,
Coimbatore.

Director, Centre for Soil & Crop Management Studies	:	Dr. S. Subramanian
Director of Research (Animal Sciences), Coimbatore	:	Dr. S. Venkatayan (upto 30.4.86) Dr. C. V. Gopalakrishnan (from 1.5.86 to 31.7.86) Dr. P. Kothandaraman (Additional charge from 1.8.86)
Director, Institute of Animal Nutrition, Kattupakkam	:	Dr. C. V. Gopalakrishnan (Additional charge upto 31.7.86) Dr. P. Kothandaraman (Additional charge from 1.8.86)
Director, Animal Health, Tiruchirapalli	:	Dr. T. M. Thangaraj
Director, Tamil Nadu Rice Research Institute, Aduthurai	:	Dr. S. Chelliah
Director, Water Technology Centre, Coimbatore	:	Dr. V. Subramaniyan, (Additional charge upto 21.12.86) Dr. P. Kandaswamy (from 22.12.86)
Director of Research (Agri), Coimbatore	:	Dr. M. Balasubramanian
Director, CARDS, Coimbatore	:	Dr. A. Kandaswamy
Director of Agriculture	:	Thiru N. Athimoolam, I.A.S.,
Director of Horticulture and Plantation Crops	:	Thiru V. Lakshmanan
Director of Agricultural Marketing	:	Thiru M. Sankaraiah (upto 30.6.86) Thiru P. Manickavasagam (Incharge from 1.7.86 to 16.7.86) Thiru A. Ethirajan (from 17.7.86 to 31.12.86) Thiru S. Balasubramanian (Incharge from 1.1.87 to 4.2.87) Thiru P. Karuppannan (from 5.2.87 to 6.3.87) Thiru S. Balasubramanian (Incharge from 13.3.87 to 30.6.87)

Director of Animal Husbandry	:	Dr. S. Rangaraj (upto 31.10.86)
		Thiru K. Allaudin, I.A.S., (from 1.11.86 to 24.3.87)
		Dr. C. Kalyanasundaram (from 25.3.87)
Chief Conservator of Forest	:	Thiru S. Kondas, I.F.S.
Chief Engineer (Agrl. Engg.)	:	Thiru S. Savadamuthu
Chief Engineer (Agrl. Engg.) River Valley Project	:	Thiru S. Gopalan (from 1.4.86 to 31.7.86)
		Thiru K. T. Narayanan (from 1.8.86)
Director of Fisheries	:	Thiru L. K. Tripathy, I.A.S. (upto 31.10.86)
		Thiru V. Manivannan, I.A.S. (from 1.11.86)
Director of Oilseeds	:	Thiru C. Narayanan
Director (Seed Certification)	:	Thiru P. Manickavasagam

Heads of Departments

Dr. G. Perumal,
Professor & Head,
Dept. of Agrl. Extension &
Rural Sociology,
TNAU, Coimbatore

Dr. M. Muthiah,
Professor & Head,
Dept. of Agrl. Extension &
Rural Sociology,
AC & RI, Madurai

Dr. Mohammed Habibullah Khan,
Professor & Head,
Dept. of Extension,
Madras Veterinary College,
Madras

Special Invitee

Prof. S. V. Pandurangan,
Professor & Head,
Dept of Extension,
Annamalai University.

ERRATA

Page	Para	Line	Read	For
7	3	1	of MBA	of an MBA
12	4	2	on	to
26	17	1	Summer	summur
29	5	3	January	Januaty
34	Item 23 Under			
		(5) 4	for	fo
37	1	8	were	was
52	7	5	village	villags
54	7	13	India	India India
55	2	2	Department	department
55	6	6	Cinemas were screened	Cinemas screened
56	3	2	basketball	baskstieall
59	5	6	the	with
64	3	6	for easy	for the easy
65	5	3	hybrids	hybrid
66	6	2	indicated that the	indicated the
67	8	2	insecticides	insecticide
81	4	5	high	higher
89	3	8	among	between
90	4	13	equilibrated	equlibrated
92	2	16	saving	savings
Appendix II				
x	Number 2		Scheme closed	
xvii	Number 14		Balance	Balancce
Appendix IV				
xvi	Number 21		in greengram	greengram
xxv	Number 4		anaerobic	anaerabic